Pests

AND THEIR CONTROL

1944

SEPTEMBER

VOL. 12 NO. 9

ORGAN OF THE PEST CONTROL INDUSTRY

Exterminators
Fumigators
Termite Control Operators
Entomologists
Insecticide and Supply Mfgrs.

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Pests

and Their CONTROL

Exterminators, Fumigators, Termite Control Operators, Entomologists, Insecticide and Supply Manufacturers

COOPERATING WITH NATIONAL PEST CONTROL ASSOCIATION

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EDITORIAL

Gems of Wisdom From the South Pacific

IT happens that Captain W. E. McCauley recently wrote to Messrs. Buettner and Dold and in the course of his letters some very significant statements concerning our business were made, as follows:

"I'm quite cognizant of the impending changes in the bug killing business. I think now that our application needs to catch up with the available postwar agents. Our machinery will need adapting to the more powerful, just as motors to 100 octane fuel or as the courts to the New Deal!"

"I sure would like to be mixed up in the thick of this modernization of the insecticide industry. When I think back a short three years to my discussion of aerosols at Purdue—and the lack of interest and understanding of what it meant—it is astounding and a striking reminder of the rapid changes prevailing in the physics and mechanics of pest destruction game."

These quotations are worth reading and rereading following which some definite action should be taken on the part of each of us to make certain that we are in step with changing times as it pertains to our industry and to be sure that we are making proper plans for the post-war period. We should adapt ourselves to the new advances which will have been made in pest control procedures just as motors have been adapted to one hundred octane fuel, as Captain McCauley so ably put it.

Nathan Sherman

Nathan Sherman, a member of the National and the N. Y. Pest Control Associations and president of the Regent Exterminating Co. (N. Y.) which he organized 13 years ago, died on August 15 from the effects of a heart attack suffered the previous week. He was only 44 years old.

Active in Jewish benevolent and philanthropic societies, to which he was a generous contributor, Mr. Sherman was ever cooperative in forwarding the progress of the Industry. Devoted to his family, his friends and immaculate in appearance, he liked especially the excitement that came of witnessing sporting events.

Mr. Sherman leaves a widow, Muriel; a daughter, Phyllis; his mother, Mrs. Esther Sherman; a sister, Mrs. Lillian S. Kaster, and four brothers, Benjamin, George and Paul Sherman.

As one of his relatives so aptly expressed it: "Cut off in his youth Nathan passed on, leaving the legacy to his dear ones of his gentility, kindness and thoughtfulness for everyone. His passing is an irreplaceable loss."

Notice to Readers

Your cooperation in mailing your invoice or marking on a slip of paper expiration date when renewals are mailed in with remittance would be appreciated.

PCO Quiz—No. 7

Multiple Choice Questions. You are to check the correct answer. Score yourselves 4 points for each correct answer. Consider yourself above average if you score 80, and average if you score 64. Check the correct answers on page 10.

76 to 78. Underline the three plant poisons in the following list: rotenone, sabadilla, chloropicrin, gesarol, strychnine, phenothiazine.

79 to 81. Underline the three materials in the following list usually classified as contact poisons: nicotine, thiocyanate, sodium fluoaluminate, arsenious acid, naphthalene, rotenone.

82 to 84. Underline the three materials in the following list usually classified as fumigants: methyl bromide, borax, naphthalene, rotenone, hellebore, carbon tetrachloride.

85 to 87. Underline the three materials in the following list that may serve as food for clothes moth larvae: cotton, mohair, leather, wood, feathers, lead.

88. An authority on termites in the United States is: (1).....Back, (2).....Bishopp, (3).....Cotton, (4).....Snyder, (5).....Campbell, (6).....Roger Smith.

89. An authority on stored grain insects in the United States is: (1).....C. C. Hamilton, (2).....Cotton, (3).....Snyder, (4).....Back, (5).....Palm, (6).....Herms.

90. An authority on household insects in the United States is: (1).....Back, (2).....Herms, (3).....Annand, (4).....Oderkirk, (5).....Bishopp, (6).....Deay.

91. An authority on insects affecting man and animals in the United States is: (1).....Hoyt, (2).....Campbell, (3).....Bishopp, (4).....Alexander, (5).....Rohwer, (6).....Buettner.

92. An authority on rodents in the United States is: (1).....Roark, (2).....Herms, (3).....Cotton, (4).....Ward, (5).....Rosewall, (6).....Goldberg.

93. There are now scheduled in North America, regional PCO Conferences to the number of (1).....3, (2).....4, (3).....5, (4).....6.

94. The 1944 president of the National Pest Control Association is: (1).....Pete Bohman, (2).....George Elliott, (3).....Franklin Roosevelt, (4).....Bill Buettner.

95. The 1944 secretary of the National Pest Control Association is: (1).....Bill Buettner.

96. Red squill comes from: (1).....East Indies, (2).....South America, (3).....Northern Africa, (4).....Kenya Colony.

97. The 1944 War Emergency Meeting of the NPCA will be held in: (1).....Cincinnati, (2).....Chicago, (3).....Purdue University, (4).....Massachusetts State College.

98. The sense of smell is highly developed in insects to enable them to: (1).....avoid natural enemies, (2).....avoid poisons, (3).....locate hosts, (4).....avoid entomologists.

99. Houseflies are carriers or causes of: (1).....dysentery, (2).....sleeping sickness, (3).....malaria, (4).....myiasis.

100. Dengue, a common disease of the present war and of the tropics, is carried by: (1).....fleas, (2).....mosquitoes, (3).....body lice, (4).....flies.

New Wonder 'Insecticide' Has Its Limits

Lafayette, Ind.—DDT, much publicized as the "wonder insecticide," is not a universal material effective against all insects, declare Purdue University entomologists. Although highly effective as a fly spray and louse powder, it has little effect on certain other pests. As a matter of fact, its use may greatly increase the numbers of some pests, such as the red mite, by killing the predatory insects which normally hold them in check.

In general, however, DDT appears to be very promising for future control of numerous insects. The experiments to test its effect on insects, plants, and higher animals are still in preliminary stages. It is being tested now by Purdue research entomologists and also by numerous federal and experiment station workers. Many additional tests will have to be made before the material can be recommended as an agricultural insecticide.

There is no need for insecticide dealers, farmers, and Victory gardeners to make inquiry regarding sources of supply, as DDT is not yet available for civilian use.

—*Chicago Daily News.*

SANITATION IN PEST CONTROL

By **A. E. MICHELBACHER**, *University of California, Berkeley*

Editor's Note: The following paper was read at the War Emergency Meeting of the Pest Control Operators of California, Inc., February 1, 1944.

THE importance of sanitation to the pest control operator cannot be over-emphasized either in peace or war times. However, under war conditions it assumes greater significance. Foods and other materials are being accumulated in large stock-piles, and their protection in a big measure depends upon having them stored under sanitary conditions. In this time of labor and material shortage all supplies, whether civilian or military, should be protected from pests with greater care than under normal conditions. The responsibility of the pest control operator in limiting losses is a pressing one.

Sanitation probably enters every activity of the pest control operator. My remarks will be mainly limited to sanitation in relation to insects, although it is very important in rodent control, and is involved in the correction of fungus infestations.

Under ideal conditions sanitary measures should be maintained from the start. Serious infestations are not likely to develop under such conditions. However, a pest control operator seldom has an opportunity to supervise a project from the beginning and is usually not consulted until a problem has arisen. The situation may be easy to remedy or it may present a nearly impossible condition.

I would first like to discuss storage facilities where faulty construction prevails, and where insects of various species have been allowed to build up in large populations. Infested materials are found everywhere, and insects have migrated so they can be found not only throughout the structure but also widespread on the outside. The problem of cleaning up such a situation is exceedingly difficult. The elimination of the infested materials is an important step, but destroying the insects that have worked deep into cracks and other openings is not an easy task. The destruction of infested materials that have worked their way through cracks in the floor presents a serious problem, particularly where the areas under the floors are nearly inaccessible. Not only is cleaning and a great deal of spraying necessary, but before such a structure would be really suited for storage it should be tightened, or at least the more important cracks and other possible sources of serious trouble should be eliminated.

The ease with which a storage unit can be kept clean depends to a large extent upon the type of construction. An ideal unit would be one with tight floor, smooth walls without ledges, and in general constructed so that it could be easily kept clean. Such a storage structure is not always possible to construct and very often it is necessary to make use of the buildings that are available.

The type of construction and the necessity for sanitary measures varies with different types of business. This point can probably be best illustrated by contrasting a concern which manufactures poultry feed with one that produces quality candy. In both cases sanitation and proper construction are extremely important, but to a different degree. With the manufacture of poultry feed it is necessary that the plant and machinery be kept clean, that lots of raw and finished products be kept moving in an orderly manner. The mixing of new and old lots should be avoided, and returned containers should be fumigated or otherwise treated if they show evidence of being infested. Further, cleanings should be adequately taken care of and small accumulations of foodstuffs should be disposed of. As far as construction is concerned, the floors, bins and other storage facilities should be tight and constructed in a manner that facilitates easy cleaning. Under these conditions serious infestations are not likely to develop, but because of the great volume of material handled, incipient infestations probably occur at a number of points throughout the plant. A close examination of such a plant would probably reveal this to be the case. As long as the insect populations remain at this low level, the plant can operate without serious losses from insects. On the other hand, in a factory producing quality candy this would not be true. It is probably safe to conclude that an infestation one hundredth as large as found in almost any large feed mill would cause deep concern. An incipient infestation no matter how small might be a source of serious trouble. This would be particularly true if the insect involved should be one of the moths attacking stored products. An exceedingly small infestation might produce moths so that an egg could be laid on one out of every several thousand pieces of finished candy. This is certainly not desired with a quality pack. To avoid this, proper construction and exciting sanitary measures must be practiced. All parts of the plant must be kept thoroughly cleaned, and accumulations of foodstuffs, no matter how small, should not be tolerated. It should be remembered that exceedingly small amounts of foodstuffs left undisturbed for long periods may serve as breeding places for sufficient insects to be very troublesome. It is also necessary to carefully inspect raw products, as well as returned containers, and these must be freed of living insects if they are found to be infested.

Sanitation is important in all kinds of construction. The problem of maintaining proper sanitation, however, varies somewhat according to the materials used in constructing warehouses or other storage facilities. It is least difficult where metal or cement is used and greatest where wood is the principal construction material. When empty, metal or cement storage structures are rather easily cleaned even though they may have contained heavily infested materials. This is not usually the case with wooden structures. There are many cracks in which insects can secrete themselves, and there are some stored product pests that are rather strong wood borers. Two of these, the cadelle and the lesser grain borer, are rather common. Once these insects have bored into wooden structures it is not an easy matter to get rid of them. Therefore, when wooden storage is involved, strict sanitary measures should be practiced from the start, for otherwise infestations nearly impossible to handle may develop. Since the start of the war, metal for storage construction has been very limited which has resulted in more than the usual amount of wooden storage. The pest control operator can render a big service in helping to keep this new storage from becoming heavily infested and thus avoid a serious problem.

A layman is very apt to place too much confidence in fumigation. I have seen products, particularly grain, placed in bins that were lightly to heavily infested with insects. If asked why the bins were not thoroughly cleaned and sprayed before the grain was placed in them, the person or persons involved would say that if the grain became seriously infested they would fumigate it or have it fumigated. Such a practice has led to serious trouble, and it can be definitely stated that fumigation is no substitute for proper sanitation. When storage space is emptied it should be thoroughly cleaned and the walls, ceiling and floors sprayed with a good contact insecticide if this is necessary. Fumigation certainly has its place, but no one should ask for trouble by placing products subject to infestation into insect infested storage. This is particularly true if the failure to clean up the storage facilities was due to neglect.

It might also be pointed out that if the storage space is infested, the surrounding area is also likely to be infested. If the storage space is of proper construction fumigation might well result in a satisfactory kill, but even if this is the case sanitary measures will have to be relied upon to kill the insects on the outside. Further, if the infestation could have been avoided by cleaning and spraying the empty storage, the cost would have been less, and there would also have been a saving of critical materials.

Man power shortage and ceiling prices, fixed for certain types of storage at least, have added to the difficulty of pest control. The observance of best sanitary practices under these conditions can not always be carried out. For instance, frequently there is a warehouse or a portion of one that is empty except for a few lots of scattered materials. Instead of concentrating these to facilitate a thorough clean-up they are left in place and the cleaning is done as well as possible. Such a practice certainly increases the danger of serious insect attacks.

Often, where products are cleaned, the screenings or foreign materials contain a considerable number of destructive insects. Unless these materials are disposed of the insects are likely to crawl from them and reinfest materials held in storage. The products from cleaning usually have some value and frequently efforts are made to salvage them. However, if such materials cannot be moved from the storage area almost immediately, they should be fumigated or otherwise treated to kill the insects present. One large producer and dealer in grain for feed purposes was greatly troubled with his products becoming infested from cleanings. Despite considerable salvage of the cleanings he installed an incinerator and had the cleanings carried direct to it which greatly helped to reduce his insect problem.

A definite relation exists between rodents and insects. Unless rodents are controlled it is not likely that proper sanitary conditions can be maintained. Where rodents are abundant they eat into packages and sacks which causes leakage. Large amounts of materials subject to insect infestation are exposed which makes conditions ideal for destructive insect populations to develop. Also, investigations carried on by Dr. E. G. Linsley of our staff and others have shown that many insects that infest stored and animal products live and breed in the nests of rodents. Thus the nests of rodents might become the source from which infestations arise.

Sanitary measures play an important role in the control of clothes moths and carpet beetles. Frequent use of a vacuum cleaner, brushing, beating and sunning all help in checking damage by these serious pests. It is highly essential that articles subject to attack be thoroughly cleaned, especially if they are in locations seldom disturbed. Where serious infestations occur and the materials cannot be mothproofed, fumigation may be necessary. Even here sanitary measures need to be considered. Sources of infestation should be eliminated and wool lint and other waste suitable for food for the insects should be removed from around baseboards and floor cracks as well as from the air shafts of hot-air furnaces. Further, cracks in the floor and the crevices along baseboards should be filled with plastic wood or similar material if this is at all possible.

Other sources of infestation should also be eliminated. Frequently woolen goods or similar materials are stored in attics or basements and forgotten. They may be heavily infested and if not disposed of may furnish a source of serious infestation. Bird nests are known to be breeding places for carpet beetles and these built close to a home or under tiling of roofs should be destroyed as soon as they are deserted. Bees' nests in walls are a very important source of infestation and where bees are killed the nests should be removed if this is possible. Wasps' nests may also be infested, and spider webbing has been reported as furnishing a breeding place for both carpet beetles and clothes moths.

In the home pantry insects can usually be controlled by eliminating the source of infestation and through the adoption of sanitary measures. However, under certain conditions and with some species of pests an infestation may become so general that more drastic methods of control must be employed along with good sanitary practices.

The control of cockroaches calls for the elimination of their breeding places, and fly control, if it is to be successful, involves the proper disposal of manure, garbage and similar materials. Control of fleas can be facilitated if the bedding places for pets are kept thoroughly cleaned.

Damage from crickets and similar insects can be limited by keeping rugs, drapes and clothing clean. Clean materials may escape injury while those with grease spots or food stains are likely to be seriously attacked if not ruined.

Yard sanitation is also important in the control of certain dooryard pests. The elimination of breeding or hiding places of such organisms as the European earwig, millipeds, sowbugs, snails, slugs, hibernating or aestivating beetles and bugs is of considerable value. The pest control operator who is interested in the control of garden insects will also find that certain sanitary measures will aid in the control of these pests.

Sanitation certainly plays a very important role in termite control. The destruction of infested stumps, and similar materials in the case of the subterranean termite, may eliminate serious sources of infestation. The removal of wooden forms from foundations is all important and many other sanitary measures could be listed if time permitted.

In conclusion, I would like to state that the problem that faces the pest control operator is a very important one and at times very difficult to handle. Many of the pest problems could be more easily coped with if there were some way in which they could be attacked before they were allowed to become serious. Unfortunately many laymen do not realize the seriousness of an insect infestation until large populations have developed and damage becomes noticeable.

PREMISES FOR RAT CONTROL

By ERNST SCHWARZ

RAT CONTROL must be based on an adequate knowledge of the rats. This includes their taxonomy, i. e. their distinctive characters, ecology, i. e. their habits, and their geography, i. e. their distribution. In the United States we have four commensal rats. There are the true or exclusively domestic rats, the Black rat (**Rattus rattus rattus** Linnaeus) and the Greybellied rat (**R.r.alexandrinus** Geoffroy) ; these are the chief carriers of infection, because their contact with man is of the closest. The other two commensal rats, the White-bellied rat (**R.r.frugivorus** Rafinesque) and The Norway rat (**R.r.norvegicus** Berkenhout), although associated with man and dependent on him for their existence, to a certain extent may live with the wild rodents, or act as go-betweens between them and the domestic rats. Therefore, they are primarily responsible for animal epidemics (epizootics) and for the transport of infections over wide distances.

The Black and Grey-bellied rats being primarily house rats, will cause damage indoors and in the immediate neighborhood of houses. They will breed indoors exclusively, from the basement to the attic, in the walls, or in their own burrows. The Norway rat, which is the prevalent rat in the United States, breeds on the ground in the open or in the basement of houses, but also will do damage to crops, whether they be on the stalk, or stacked away. The Norway rat is the common rat in freight yards, and is widely spread by railway traffic.

The White-bellied rat is mostly an outdoor rat, being found in fields, barns and cornstacks. It is closely connected with agriculture, and will breed outdoors, often on trees. It will go into the upper floors of houses, but will not, as a rule, breed there. In contrast to the Black and Grey-bellied rats, it occurs in the same general area, even in the attics of the same buildings that are infested by Norway rats, because the two do not compete directly.

Our knowledge of the distribution of the commensal rats in general, and of the different types in particular, within the United States is quite insufficient. It is not enough to know that rats are now found in every state of the Union (Silver 1927, p. 59). As a matter of fact there are wide areas where domestic rats do not yet occur, and there is no reason why they should not be kept permanently free. Obviously Norway rats are spread by railways more than in any other way. It is no mere coincidence that for instance they are found all along the track of the Union Pacific Railroad and that they are more firmly entrenched along the great through lines than anywhere else in the interior. In a general way it can now be said that Norway rats are found in the cities all over the United States, and that the White-bellied rat occurs in the southeastern and southern states, south of the Norfolk area in Virginia. It apparently occurs also along the Pacific Coast, but my data are scanty and not of recent date. As regards the Black rat, I have scattered records from the same general area, but, with the exception of two recent records from Florida (Rand and Host 1942, p. 20), and from Louisiana (Baton Rouge, submitted to me by Mr. G. H. Lowery, Jr. of Louisiana State University), they are at least 20 years old and cannot be trusted now. The same is true of the Grey-bellied rat of which I have a single recent record from N.W. Louisiana (see Lowery 1943, p. 250).

In order to control rats we have to apply different methods to the different rats. The fact that the White-bellied rat remains practically uncontrolled is due to the circumstances that in practice it is usually classified with **"rattus,"** and no distinction is made between it and the Black and Gray-bellied subspecies. Any control of rats moreover must be based on a thorough knowledge of their distribution within the United States. This means that we have to collect adequate data to map their distribution in detail, by city, county, state, just as we map the distribution of malaria for instance. Exact data concerning trappings can be obtained by cooperation of the Agricultural rodent control, the health control, and the private pest control firms. Such data should give the subspecies of rat, the locality, the habitat, and the density of infestation. This can be done in connection with routine rat control, and the data should be turned in to a central collecting agency where they can be computed. This would provide a strategic map for a general attack of the problem. Personally I should welcome any information that could be made available to me, and for this purpose I shall be glad to provide any help necessary in the identification of the different forms.

I am convinced that rat control should mean extermination and that it must be on a permanent basis. Insufficient measures will scatter, not destroy rats, and temporary control is nothing but a waste of money. Obviously a comprehensive rat destruction program is an expensive measure, but considering that rats have destroyed $200,000,000 worth of property in the United States within the last year, that they have caused trouble and expenditure due to the diseases they have spread, rat control is one of the cheapest things that money can buy.

Washington, D. C.

REFERENCES

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Research Findings

Protection of Dried Packaged Foodstuffs From Insect Damage

By **E. GORTON LINSLEY,** *University of California, Berkeley*

Conclusions.—1. No commercially available glass- or metal-substitute packages are known to be insect-proof against all pests.

2. The best commercial package thus far tested is a heavy fiber board carton dipped twice in thermoplastic wax. This package could be improved by closer attention to the cutting and assemblying of the carton to provide tighter fitting seams, and more careful dipping to provide a smoother, more uniform, bubble-free coverage of wax.

3. Repellents offer promise of increasing the usefulness of the various wax- and paper-coated packages. Among the more promising materials thus far investigated are the dinitro-cresol compounds.

4. Dehydrated foodstuffs, in spite of their low moisture content, are subject to insect damage and infestation. They require essentially the same protection from insects that is afforded air- and sun-dried products.—12-8-43. —*Jour. Econ. Ent., June,* 1944.

Aerosols vs. Oil Spray Insecticides

A Study of Comparative Efficiency

By **J. H. FALES** *and* **L. D. GOODHUE***
United States Department of Agriculture

—Reprinted from Soap and Sanitary Chemicals, July, 1944.

THE efficiency of insecticides in aerosol form has been the subject of inquiry since the liquefied-gas method of producing aerosols was first described (2, 5). The aerosol method being new, not many of the factors that affect its efficiency are understood, whereas much more is known about sprays which have been under investigation for more than 40 years. Some preliminary tests showed that the aerosol produced by Freon-12 (dichlorodifluoromethane) gave a higher mortality of houseflies than a spray applied with a standard Peet-Grady atomizer (DeVilbiss No. 5004), but extensive comparisons were not made.

In a continuation of this study aerosols and sprays were compared in two different ways. In one experiment the length of the effective period was determined by introducing the insects into the test chamber at different intervals after the application of the insecticide and exposing them for the usual 10-minute period. In another experiment the rapidity of action was studied by applying the insecticide while the insects were in the chamber and shortening the exposure period, the first experiment would favor the aerosol because it settles much less rapidly than a spray, whereas the second would be expected to favor the spray because its maximum effect takes place in a very short time.

Materials and Methods

The tests were conducted essentially by the Peet-Grady method, with some modifications (McGovran et al. 3) to adapt it to the study of aerosols. All the aerosol and spray solutions were made from a sample of pyrethrum extract specially purified for use in aerosols. According to the manufacturer's analysis this sample contained less than 1 per cent of "Freon"-insoluble material and 20 per cent of total pyrethrins (Seil method).

The spray was prepared by dissolving 1.0 gram of this extract in enough deodorized kerosene to make 100 ml. This gives 2 mg. of total pyrethrins per milliliter. The aerosol solution was made by dissolving 10 grams of the extract in 90 grams of liquid "Freon" in a closed container to give a solution containing 2.0 per cent of total pyrethrins. The dosage of 10 milliliters of the spray and 1 gram of the aerosol solution therefore gave the same amount of total pyrethrins, 20 mg., by each method.

Houseflies for test purposes were reared by the usual methods and were used for testing 3 to 5 days after emergence. The walls of the Peet-Grady chamber were washed and the paper on the floor was changed after each test. The spray was introduced with a standard Peet-Grady atomizer at 12½ pounds air pressure through eight openings. The aerosol was discharged through one of these openings diagonally across the top of the chamber.

The time of exposure and the period of delay before introducing the insects were reckoned from the instant one-half the spray or aerosol was applied. After such exposure the ventilating fan was turned on and the knocked-down flies only were collected. The mortality was noted after 24 hours and the percentage based on the total number of flies. Each test in both experiments was replicated six times. For each experiment an entire set of tests, with both aerosols and sprays, was run on the same day to equalize day-to-day variations in the resistance of the flies. The resistance was always checked by spraying 12 ml. of the Official Test Insecticide (pyrethrins 1 mg. per ml.).

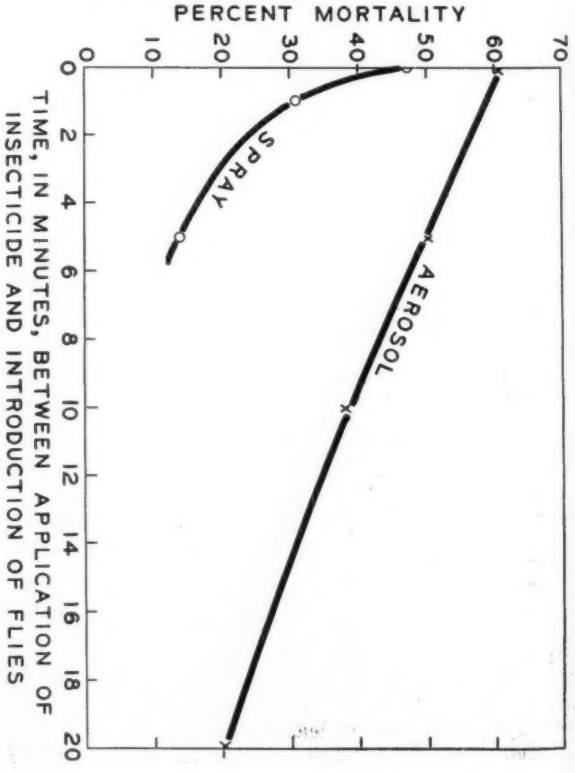
Comparing the Effective Periods of a Spray and an Aerosol

To determine how long a spray or an aerosol would remain effective after application, the insecticide was introduced and, after delay periods of 0, 1 and 5 minutes

Table 1.—Effectiveness of delayed 10-minute exposures of houseflies to pyrethrins applied in aerosols and sprays. Dosage, 20 mg. of pyrethrins.

Method of application	Exposure delayed	Knockdown: In 5 minutes	Knockdown: In 10 minutes	Average mortality in 1 day
	Minutes	Per cent	Per cent	Per cent
Spray	0	78	93	47
	1	73	96	31
	5	63	85	14
Aerosol	0	53	84	61
	5	70	93	50
	10	59	86	38
	20	42	74	20
O.T.I., spray	0	....	92	25

Figure 1.—Mortality of houseflies resulting from delayed exposures to pyrethrins applied in aerosols and in sprays.



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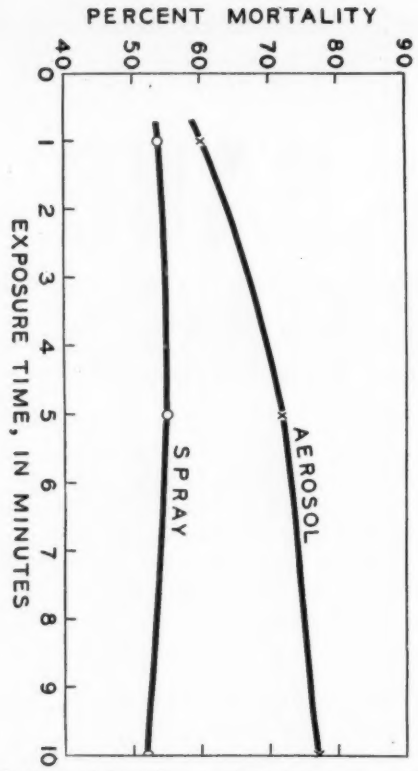

Figure 2.—Mortality of houseflies resulting from various short exposures to pyrethrins applied in aerosols and in sprays.

Method	Exposure	Knockdown—In 5 minutes	Knockdown—In 10 minutes	Average mortality in 1 day
	Minutes	Per cent	Per cent	Per cent
Spray	1	82	89	54
	5	82	91	55
	10	85	96	52
Aerosol	1	53	80	60
	5	67	85	72
	10	69	89	77
O.T.I., spray	10	....	91	29

Table 2.—Effectiveness of short exposures of houseflies to pyrethrins applied in aerosols and sprays. Dosage, 20 mg. of pyrethrins.

for the spray and 0, 5, 10 and 20 minutes for the aerosol, the flies were introduced and exposed for 10 minutes. The data are given in table 1.

Effect of Various Short Exposure Periods

In these tests the flies were introduced into the Peet-Grady chamber before it was treated with spray or aerosol and the time of exposure was reduced. After 1 minute's exposure in one test and after 5 minutes' in another the suction fan was turned on and the chamber aired. In a third test the flies were exposed the full 10 minutes. The flies were then collected at the end of 10 minutes in each test. The data are given in table 2.

Discussion

From the mortality data in the first experiment it is evident that the aerosol produced with "Freon" is more effective than the common type of fly spray both initially and upon delayed exposure. When the flies were introduced after a delay period, the aerosol was more effective after 20 minutes than the spray was after 5 minutes. The fine particles in the aerosol remain suspended and effective for a considerable period.

When applied to flies already in the chamber, the aerosol was superior even when the time of exposure was reduced to 1 minute. And with a longer exposure the mortality from the aerosol increased considerably, while there was no increase with the spray.

The 10-minute knockdown averaged approximately 7 per cent less with the aerosols, but even after a 20-minute delay in starting the aerosol test it knocked down 74 per cent of the flies.

The physical difference between the aerosol and the spray used in these experiments is not only in the particle size but in the concentration of the insecticide in the particles. Some reports in the literature indicate that small particles of a fly spray are not so toxic as large ones (1, 4). This is especially true when the concentration of insecticide in the particle is low. If the concentration is increased, as it is in the aerosol, the particle size can be much smaller and still be effective. Apparently the minimum effective concentration becomes greater as the particle size becomes smaller.

The experiments reported in this paper were made with one type of spray and one type of aerosol. There are, however, many methods of producing both sprays and aerosols, and much variation in the particle size of each can be expected. The physical difference between the two is only in the degree of dispersion, and no clear line of demarkation can be drawn. A coarse aerosol and a fine spray may have the same particle-size distribution.

Summary

The comparative effectiveness against houseflies of sprays produced with a standard Peet-Grady atomizer and aerosols produced by liquid "Freon" has been determined. The aerosol is superior when sprayed directly on the insects, being slightly better even with exposure periods as short as 1 minute. When the insects are not exposed until some time after the insecticide has been distributed, the aerosol is more effective after 20 minuts than the spray is after 5 minutes. The 10-minute knockdown effect was about 7 per cent greater with the spray, but the knockdown with the aerosol was still 74 per cent after a delay of 20 minutes before exposing the flies.

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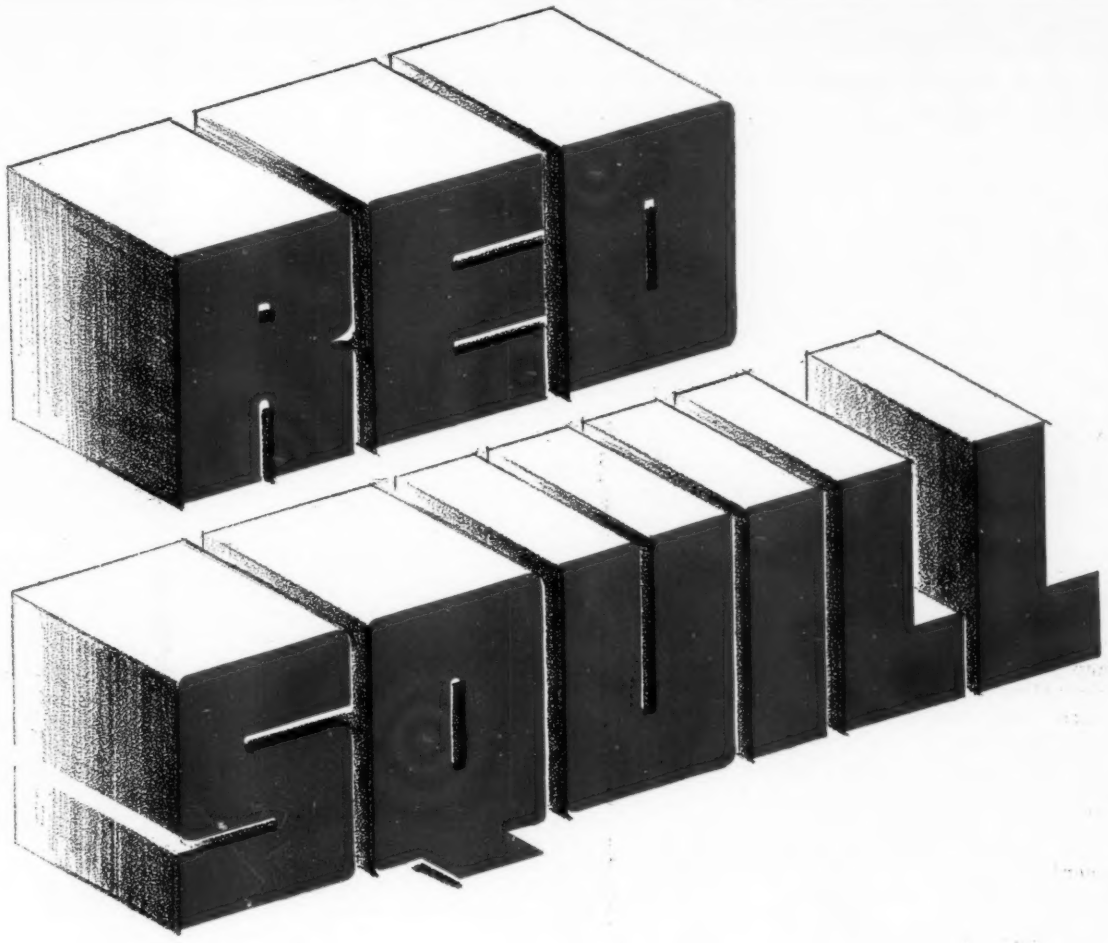
*Before 30th mid-year meeting, Natl. Assn. Insecticide & Disinfectant Mfrs., Chicago, June 12, 1944.

Answers to Multiple Choice Questions

76. Rotenone
77. Sabadilla
78. Strychnine
79. Nicotine
80. Thiocyanate
81. Rotenone
82. Methyl bromide
83. Naphthalene
84. Carbon tetrachloride
85. Mohair
86. Leather
87. Feathers
88. Snyder
89. Cotton
90. Back
91. Bishopp
92. Ward
93. Five
94. George Elliott
95. Bill Buettner
96. Northern Africa
97. Chicago
98. Locate hosts
99. Dysentery
100. Mosquitoes



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Liquefied Gas Aerosols—Postwar

By **W. W. RHODES**, *Kinetic Chemicals, Inc.*

IN the late '20's a number of accidental deaths in the city of Chicago, attributed to a refrigerant which had previously been considered non-toxic, threatened for a time the future of the rapidly expanding household refrigeration industry. In this emergency Charles F. Kettering, of General Motors, called in Dr. Thomas Midgley, Jr., and gave him the task of finding non-toxic, non-flammable, safe refrigerants. The result of the research was the discovery of the "Freon" group of refrigerants of which "Freon-12" or "F-12" is the most widely used.

Under the pressure of warfare, Goodhue and Sullivan and their associates of the Bureau of Entomology and Plant Quarantine have developed and demonstrated the remarkable properties of the liquefied gas aerosols. I need not point out to you the spectacular and continued success of this type of aerosol with the armed forces. When this program was initiated the first reaction of some manufacturers of insecticidal materials was bewilderment. They were mentally off balance, unoriented, and could not see for a moment where they fitted into the picture. Some were prone to argue that this was rich Uncle Sam's toy, very expensive, suited to war-time needs but, because of excessive cost, non-competitive in a peace-time world. Everything was measured in terms of the selling price compared with unit selling price of oil sprays.

Presently, however, the Chemicals Branch of the War Production Board was assisting each of the manufacturers who wished to participate in the program to secure machinery for making the 20 per cent pyrethrins concentrate required for the liquefied gas aerosol of the armed forces. Again necessity was the mother of invention. Those manufacturers who are making 20 per cent pyrethrin concentrate deserve to be complimented for doing a remarkable job in a short space of time under pressure. Every week it seems they have achieved lower and lower "Freon" insolubles and their products are now very satisfactory.

Let us assume for just an instant that aerosols are a luxury that only the government can afford and that with the end of the war they will disappear from the insect control picture. Has this development been in vain? I think not! Never before in the history of the insecticide industry has so much research been conducted both by private laboratories and the United States Department of Agriculture and this research has been stimulated by the development of aerosols. Historians of the industry will record the decade commencing in 1942 as the Renaissance of the Insecticide Industry in America.

I was asked to come here to debate on the aerosol side versus spray-type insecticides and no doubt some, are expecting me to take a crack at oil sprays. I am afraid that I shall not be able to do that. Oil sprays have played a very useful role in the insecticide world these many years and I think will continue to do so, but not the oil sprays of yore. The oil sprays of yesterday have been a means of selling some oil—a sort of by-products department of some of the oil companies. They have been subject to extreme price competition and the grade has varied quite widely. Several companies it seems became disgusted with this situation and began to give the public an AA spray but lost money until they established the fact that their brands were worth more money than poorer brands sold in competition. I have no doubt that research is being conducted right at this moment to improve spray-type insecticide materials and that there will be a place for such products in control work.

Dr. Goodhue has stated that one pound of aerosol is equivalent in effectiveness to two gallons of oil spray. I have asked Dr. Goodhue to enlarge on this statement and he tells me that he had in mind when making this statement an aerosol containing 1 per cent Pyrethrins I and II plus a suitable synergist, and that the oil spray referred to was an AA grade. Taking this as a basis for comparison of the two types of the control materials, let us try to figure out the possible selling price of an aerosol in the post-war period and compare that selling price with the selling price of oil sprays in the pre-war period and at the present time.

The cost of manufacturing a liquefied gas aerosol for household use will vary with the location of the plant for filling dispensers and the extent of territory served by this plant. In general, it should be cheaper to load containers and sell aerosol in a densely populated district and confine sales from the plant to a radius of from 100 to 150 miles from its location than to set up large central plants at one or two locations and attempt to conduct a national distribution from these large centralized plants.

I visualize a plant located in an eastern area with great masses of the population within 100 to 150 miles of its door. I am assuming that the 1-pound container will be the popular size with the public and that returnable containers will be employed. I am further assuming that the plant doing the loading is equipped with the finest machinery, is streamlined for production, and is operated by men who understand the handling of liquefied gases. The loss of gas when a good technique is employed need not exceed 3 per cent of the amount handled, but the inexperienced frequently lose from 15 to 20 per cent and such losses cannot be borne as they wipe out most of the profit. In the post-war period I think that the lowest price that could immediately be quoted to the public might be $1.25 per pound and the highest price, $1.45 per pound. This is without reference to the container.

The objective of a number of manufacturers of returnable 1-pound containers is to be able to sell one for $.50 and make a profit. Such a container will have a value through which it may be refilled and will be suitable for use during a period of 25 years. This container sold to the aerosol loader at $.50 should reach the public at $.75. On the initial purchase of one pound of aerosol the customer will buy a container and the pound of aerosol for a sum, say, of $2.00. He then becomes the owner of a dispensing device. This dispensing device may be returned to the dealer when making a new purchase and an identical one will be turned over to the customer and he will pay only the price of one pound of aerosol which may be $1.25. He will not be allowed to return the container for a refund as that would place

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too much of a financial burden on the aerosol loader during the slack months of the year.

Some I know are speculating on how much capital will be necessary to get into this business. An efficient loading plant will cost from $50,000 to $75,000 to erect and equip. Stocks of raw materials and containers must be financed before the season opens and there may be as much as $300,000 tied up in stocks before the selling season. The plant for which I have given the cost above would have a capacity of about 300,000 pounds per month and it will hardly be economical to erect plants of less capacity than this amount.

Having established a possible price for aerosol, let us compare aerosols with oil sprays. Possibly the fair unit to compare with a pound of aerosol is a quart of oil spray. Oil spray of AA grade is priced at present at $.45 per quart. No gallons seem to be available this year but in the past they sold for $1.49 to the public. Two gallons of oil spray which cost the public $2.98 can be replaced by one pound of aerosol at $1.25 to $1.45. Based on the efficiency of killing flies and mosquitoes, that aerosol is less than half as costly as oil spray.

Can aerosol be used effectively so that this saving can be achieved? It surely can if one takes pains not to use too much, and the careful man will make the saving. Will the average man effect this saving? Certainly not. He won't even want to. He'll be like the little boy with his first air rifle shooting sparrows. He'll try to kill everything that flies, buzzes and crawls. If a mosquito bothers him in the night he'll kill it without even turning on the light. Liquefied gas aerosol is the answer to the lazy man's dream for killing flies and mosquitoes. He can de-sect the room without even putting down his newspaper. The business of the spray gun evidently was not a pleasant job—else why have fly paper, ribbons and poisons been active competitors of the spray gun and oil sprays?

The amounts of insecticide ingredients used per year will be greatly enlarged and the insecticide business greatly expanded. Dealers' stocks will turn over more rapidly and they will probably be content to handle for a 30 per cent mark-up rather than the 50 per cent extended on the slower moving oil sprays. Mark-up and turn-over are, and always will be, closely related.

There are certain problems presented in the design of acceptable containers or dispensers for aerosols. The Bureau of Explosives of the Interstate Commerce Commission has jurisdiction over the shipment of compressed gases in interstate commerce and the rules for the shipment of such gases are included in Agent W. S. Topping's Freight Tariff No. 4 which is issued from the office of the Bureau of Explosives at 30 Vesey Street, New York City. In Section 300 of this tariff a compressed gas is defined as "any material with a gas pressure exceeding 25 pounds per square inch at 70° F.; or any liquid inflammable material having a Reid vapor pressure exceeding 40 pounds per square inch absolute at 100° F." If a liquefied gas aerosol were shipped to civilians in interstate commerce today the containers used would have to meet the Specifications ICC 4B 300. Because all of the present aerosol output is purchased by the armed forces, however, the containers need not comply with Specifications ICC 4B 300 because under Part 3—Regulations Applying to Shippers, Paragraph 16 provides that the War and Navy Departments of the United States may make their own regulations.

The containers which are being used by the Army and Navy comply with most of the specifications for an ICC 4B 300 cylinder but fail to meet the specifications completely. The Navy Department has of late essentially adopted ICC 4B 300 Specifications but there are a few difficulties in manufacturing dispensers to comply with these specifications and exceptions are being granted at present to most of the manufacturers.

The problems involved in making a small container are in some measure different from the problems encountered in making a larger one and, as a consequence, the Compressed Gas Manufacturers' Association set up an Aerosol Committee on May 16th to study the problems involved in the shipping of liquefied gas aerosols. I was made the chairman of this committee and the committee now includes every one of the war contractors for either aerosol or containers and those who will be interested in manufacturing containers in the post-war period. This committee formed a sub-committee, of which J. H. MacVeigh, of the Pressed Steel Company of Wilkes-Barre, is the chairman, to suggest modifications of ICC 4B 300 so that the manufacturers may make a safe container but be freed of some of the costly testing which must be conducted under ICC 4B 300. The committee has had three meetings and is about ready to send its suggestions to the Bureau of Explosives of the Interstate Commerce Commission. The type of container permitted must be a so-called seamless container. This means a container without a longitudinal seam. Sections of the container may be joined by welding or brazing and if brazed, the brazing material must have a melting point of not less than 1000° F. The ordinary brazing material for this purpose is a metal such as copper or an alloy such as silver solder. The minimum wall thickness for any cylinder shall not be less than .050 inch and the cylinders must be able to stand a pressure of 1200 pounds per square inch without bursting. Each container must by hydrostatically tested to 600 pounds per square inch and show no defect. Each of the cylinders is marked with identification symbols and is to be retested every five years. The cylinders are to be equipped with valves and safety devices approved by the Bureau of Explosives. The safety device may be either a fusible plug or a frangible disc.

A dispenser is never loaded to its complete capacity as there must be a volumetric outage of 10 per cent in each container to provide for the liquid expansion of the compressed gas. In 302(h) of the tariff, filling density is defined as "the per cent ratio of the weight of the gas in a container to the weight of water that the container will hold." In Paragraph 302(k) there is a table showing the maximum permitted filling density for each of the liquefied gases and this density has been arrived at through consideration of the volumetric expansion of each of the gases in the liquid phase.

Liquefied gases expand very rapidly in the liquid phase when their temperature rises. They are similar to mercury in this respect. However, the fusible plug in the cylinder will melt somewhere between 157° F. and 165° F. with an average of 162° F. Consequently, before the dispenser becomes entirely full and ruptures, the fusible plug will melt and liberate the gas. Frangible discs are also made to burst prior to the temperature at which the cylinder becomes completely full and thus liberate the pressure. If we did not have these safety devices on the containers they might under certain conditions become bombs, blowing up and injuring the innocent householder.

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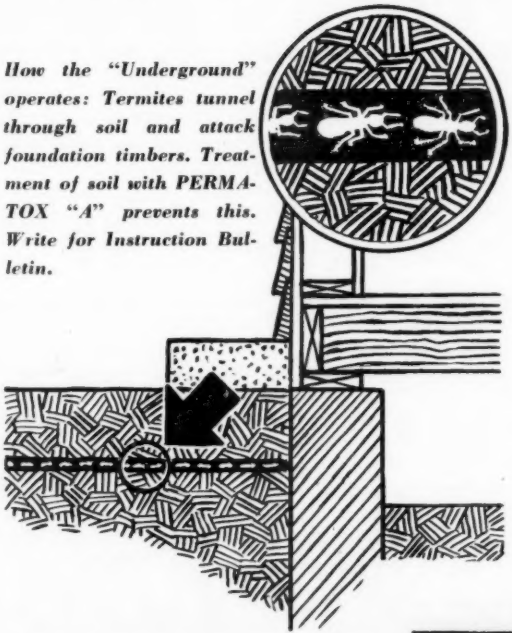

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ejected at this pressure would not be an aerosol. It could probably be defined as a fine spray. I think it very likely that the line of demarcation betwen a liquefied gas aerosol and a spray will be set at the above pressure figure.

There are a number of patents covering the use of liquefied gases in aerosol as well as a patent covering the production of aerosol itself and it may be assumed that the licenses under these patents will be such that there may be no short-cutting which will endanger the public. The premise I have formulated for the initiation of civilian business in aerosols is: "The public must not be injured physically nor defrauded financially," and I think it would be well for NAIDM and all others who have anything to do with this business to adopt this objective and contribute toward it wholeheartedly.

The public might be injured physically by other than an explosion of the container. The question of toxicity of the ingredients of the aerosol must be considered and no aerosol should be sold for use in confined spaces which is toxic either to man or animals. The best measure of toxicity, of course, is the experience of long-time exposure under various conditions of numerous human beings to the effects of such ingredients.

Over one hundred million pounds of "Freon" refrigerants have been used in the United States during the last fourteen years and during that time there have been leaks in millions of refrigerating machines, yet there has never been a proved case of injury to the public through exposure to the gases. "Freon-12" has been tested by the Bureau of Mines, by the Underwriters' Laboratories, by the Medical School of Harvard University, by the Kettering Laboratory of the University of Cincinnati, by the Jackson Laboratory of the Du Pont Company, and by numerous other institutions. All of these tests have been quantitative and the subjects have been guinea pigs, dogs, monkeys and human beings who have volunteered. One experimenter has injected it in the skulls of several human beings in the course of a piece of research that he was conducting on a brain disease and found that it did not injure the brain. All results, both scientific and practical, lead to the conclusion that dichlorodifluoromethane is an extremely inert gas and no more toxic than nitrogen. Nevertheless, each package of aerosol should bear the cautionary statement that it should not be used in any enclosed space in which there is an open flame. The reason for this is that most every organic body breaks down in the presence of an open flame and in the case of dichlorodifluoromethane, acidic decomposition products are created.

Pyrethrins have also been used in large quantities throughout the world for a great many years without record to toxicity to human beings and animals and it may be assumed, therefore, that they are non-toxic. I know that there are cases in which people are allergic to pyrethrins, but these same people may be allergic also to other products of plants. I am very hopeful that the allergy is not the result of the pyrethrins themselves but some of the other chemicals which have been carried in the extracts. Perhaps we shall find that the allergy-causing substance is one of the "Freon" insolubles and we shall not experience as many cases of allergy with aerosols as have been found in the past with oil sprays. It is certainly true that the newer 20 per cent concentrates have less odor than the former extracts and I think we may assume that aerosols will have practically no odor.

Tests for toxicity of ingredients must be extensive. Substances proposed for inclusion in aerosols should be tested exhaustively. It is very easy to assume that a product is non-toxic from results of a few small-scale tests but one must be absolutely sure that the product is non-toxic before selling it for general use. There will be numerous people who will attribute physical ills to exposure to aerosol and the manufacturer and vendor of this aerosol must be prepared to defend himself against suits at law. If he cannot prove that the product that he sells is non-toxic, he may have innumerable settlements to make. Consequently, the safe ground is to use non-toxic materials for which a relatively low rate may be obtained in product insurance.

Before the employment of the "Freon" refrigerants by the refrigeration machinery companies of the United States, these companies were accustomed to making settlements in connection with the alleged damages to human beings from exposure to refrigerants and the total amount paid out in settlements each year was not an insignificant figure. We know of no cases where insurance companies have settled cases of alleged damage from exposure to the "Freon" refrigerants, and in two notable cases which have come to trial, the result has been a decision that "Freon-12" caused no injury.

The test for toxicity must be made in three different ways. The materials must be tested for their effect on inhalation. They must be tested for their effect on the skin and adsorption through the skin and, further, they must be tested as stomach poisons and results of these tests must be evaluated in the amounts that may be tolerated without any toxic effects. If this new industry is to constitute a service to the American people, the containers must be safe, the right amount of aerosol must be loaded in every container, and the ingredients of the aerosol must be non-toxic.

I would like to emphasize again that it will not be possible to load aerosol cylinders at every gasoline pump or in a store from larger containers because the loss of the product and because careful inspection will be necessary to prevent the overloading of the containers. The operations of mixing and loading must be conducted under the supervision of qualified people. It is very easy to assume that the handling of a liquefied gas from one container to another should present no difficulties. I assure you that there is no more fallacious assumption. A liquefied gas such as "Freon-12" cannot be seen as it escapes. It has very little odor and is one of the most elusive substances known to man.

Dr. Goodhue has pointed out in some of his papers that it is unnecessary to use a non-toxic and non-flammable propellent if the insecticide chemical dissolved therein is of the same order of toxicity or more toxic to man than the propellent itself. This is undoubtedly logic and in the open air a wide variety of propellents may be employed, many of which will be found to be cheaper than "Freon-12." However, the public should be cautioned not to smoke when using an aerosol containing a flammable propellent, and if a very toxic aerosol is projected then a suitable mask should be employed by the person conducting the plant treatment.

Because of the length of time liquefied gas aerosols stay suspended in the air, the exposure time is relatively great and the danger from toxic effects from inhalation by red-blooded animals, correspondingly great. Exposure time and particle size are exceedingly important factors in connection with toxicity. A chemical insecticide projected as an oil spray might be found to be non-toxic

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because of the relatively short drop curve of three minutes. Most people when using a spray gun are standing and exposure time at the level of the nose and mouth is of short duration. The same insecticide chemical floating in the air in the particle size of an air colloid for an exposure time of twenty minutes might be found to be extremely toxic to red-blooded animals. We should never assume that any substance is non-toxic to red-blooded animals until exhaustive quantitative tests have been made by a reliable and disinterested laboratory.

—Reprinted from Soap and Sanitary Chemicals, July, 1944.

Aerosol Bombs vs. Spray Insecticides

By **R. O. COWIN,** *Standard Oil Co. (Ohio)*

THE era in which we are now living is one of great developments which have been greatly accelerated by the present wartime necessity. These developments are bringing to the world new materials, new products, new methods, new ideas and new uses of old materials. A large part of these developments will in time fall by the wayside, but a fair per cent of them will survive and still a smaller per cent will actually turn out to be an improvement over materials and methods used heretofore.

It is altogether possible for the insecticide industry to be greatly affected by the new aerosol bomb which has been of such great aid to our armed forces in fighting insect pests. The claims made by proponents of the aerosol bomb are very interesting.

1. Its highly effective insecticidal value which is due to the combination of a high pyrethrum concentrate and sesame oil.
2. The ease of application eliminating the tiresome pumping of a fly sprayer.
3. Pleasant odor.
4. Stainless to drapes, clothing, wall paper, etc.
5. Its great degree of penetration and dispersion—only one or two jets of the vapor being necessary to kill all insect life in any average room. It spreads easily and quickly to every corner of the room from floor to ceiling.
6. It is non-toxic to warm-blooded mammals.

These claims will arouse the interest of all thinking men but will require more than superficial consideration.

In the first place very little is being said about the cost of the bomb method of spraying insecticide to the general public. I am led to believe that even its most favorable supporters have severe chills on this angle. I am told that the present bomb would have to retail at a price between three and four dollars apiece. Granting the possibility that there is enough toxic material in one bomb to last an entire summer if properly used, it can be rightfully questioned as to how many people pay anywhere near that amount for all the insect spray they use during a season. And in the second place it is to be questioned as to how many people would consider one or two jets of vapor sufficient to be effective and would not waste a large part of it.

The suggestion has been advanced that it might be practicable to reduce cost to the consumer by allowing credit for the return of a used container when the customer purchases a new bomb. Men who know tell me that the cost of the bomb is not such an important factor and not large enough to warrant bothering with the return of the used container or bomb.

Some consideration is also being given by the present manufacturers of this bomb to a small applicator similar to a capsule with a sufficient charge of "Freon" gas and toxic agent which would be sufficient for one application and then thrown away and which might be offered at retail around 25c each. It seems to me that this still represents a prohibitive cost for the average family. The first shipments and stocks of these small applicators would undoubtedly move rapidly due to the curiosity of the general public, but it can be justly questioned whether this would become a permanent buying habit by the consumer because of the cost.

It is true that some ten million of our boys will be returning after the war who will be thoroughly sold on the aerosol bomb because of their experience with it, but they will find it entirely different when they have to pay these prices out of their own pockets versus the army habit of having bombs handed to them gratis by the commissary.

I am inclined to believe, however, that the present Army aerosol program will make the post-war buying public more highly conscious of the need of **good** insect sprays which will really do an effective job. If true, this condition will be highly favorable to our industry.

Right now, it seems logical to me that the insecticide industry will develop and market a spray containing equally potent percentages of toxicants and perhaps containing an element which will increase its penetrating and dispersing qualities. Such a product could be effectively applied with an approved sprayer, either hand or electric, and at a satisfactory price. When costs are considered, the average user will give little thought to any little added exertion required to pump a spray gun.

In the second place the claim that "Freon" gas is non-toxic will bear careful examination. As may be expected, the manufacturers of refrigerators who use "Freon" gas as a refrigerant point to its long usage for this purpose without any fatal results as evidence of its non-toxicity. It is my understanding that our army people share this opinion. But not everyone concurs in this belief.

I quote a letter received from Dr. Joseph Seifter, assistant professor of pharmacology, Western Reserve University, Cleveland, Ohio, in reply to my inquiry.

"I have had no personal experience with either 'Freon' gas (dichlorodifluoromethane) or 'DDT' (dichloro-diphenyl-trichloro-ethane), nor have I come across any publications that conclusively settle the questions of toxicity of these two substances. My own personal investigations with analogous chlorinated compounds have convinced me that all of these substances are capable of producing some degree of liver injury and possibly kidney injury. I have arrived at a tentative conclusion that qualitatively all chlorinated hydrocarbons resemble each other in toxic actions, but that they show quantitative differences in this respect.

An illustration of the latter principle follows: It is widely accepted that trichloroethylene is unique in that it is not supposed to produce liver injury. However, when I thoroughly investigated this compound and compared it with dichloroethane, which is rather toxic. I found that not only is trichloroethylene capable of producing liver injury, but that it is only about twice as safe as the known toxic agent.

I am certain that if one were to make an intensive study with 'Freon' gas, he would find that it possesses at least two actions; an immediate irritating effect on

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With the 1944 insecticide season approaching its close, most manufacturers are wondering whether the next season will bring improvement or just more problems.

Happily, the signs point to somewhat easier conditions, even though it is too early to be specific as to dates or details. Still, a reasonable degree of optimism is permissible.

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the mucous membranes of the eyes and respiratory tract, and a delayed action on the kidneys and liver.

It is admitted by the Navy Department and the Department of Agriculture that 'DDT' is toxic for humans and that individuals handling it must take adequate precautions against inhaling the powder or ingesting small amounts of it with food. It is also to be noted that the current uses of 'DDT' do not extend to mass application in 'confined or closed areas.'

I regret that I am not in a position to give you more concrete information. However, it is my feeling, based on extensive experience with chlorinated compounds, that the widespread use of both of these substances as household insecticides is not justifiable at the present time."

In this connection, we also quote from Underwriters Laboratories Report M.H. 2375, Page 116.

"In the presence of flame and very hot surfaces (550 C), dichloro-difluoro-methane and dichloro-tetrafluoro-ethane are decomposed, with the formation of toxic products, which are exceedingly irritating, and therefore give adequate warning of their presence in the air even in concentrations of a very low order. The danger from the fumes depends upon the concentration and duration of exposure, but under ordinary conditions, except in unventilated places, serious danger to life is not involved."

I quote further from this same report, page 108, under the caption:

"NATURE OF WARNING—It is to be noted that the volatile toxic decomposition products or fumes produced by the above refrigerants, including also chloroform and carbon tetrachloride, in the presence of flames are exceedingly irritating, and not only give definite warning of their presence even when in very small concentrations but cause people to make efforts to escape."

Attention is also called to Table XX—Part II.

According to this report, "Freon" gas in contact with non-luminous gas flame in a 1.0 per cent by volume in air concentration affected test animal after different periods of exposure as follows:

"AFTER 5 MINUTES—Coughing, irritation and lachrymation within 1 min. Choking and weak within 5 mins. Breathing forced and labored after exposure. Gradually recovered within 2 days.

AFTER ½ HOUR — Coughing, irritation and lachrymation. White fumes at nostrils, breathing through mouth. Unable to stand within 15 min. All animals died within 20 mins.

AUTOPSY FINDINGS—Lungs of animal which died during ½ hr. exposure, voluminous, hemorrhagic and edematous; no pus. Kidneys markedly congested, tissues not damaged. Liver moderately congested. Spleen pale, but normal. No other pathological conditions."

The above statements indicate a decided danger if the product is not used carefully. It is the experience of industry that products sold to the general public should be made as fool proof as possible. We would, therefore, hesitate before risking the marketing of the "Freon" gas bomb type of applicator to the general public. It may be possible that this method of spraying would have decided advantages when sold for industrial purposes such as in stores, restaurants, theaters, institutions, etc., where it could be applied under closer supervision, and later ventilated without risk.

Toxicity tests which have been made to date have used the "Freon" gas pyrethrum extract and sesame oil combination. To the best of my knowledge no experiments have been conducted using "Freon" gas with rotenone or with the thiocyanates such as "Lethane" and "Thanite." It is the feeling that the toxicity of the thiocyanate compounds has not been thoroughly explored. They might be very toxic if used as an aerosol with "Freon 12."

In addition to the question of economics involved and of the danger because of toxicity, some consideration must also be given to the fact that the adoption of this method might create a monopoly of the fly spray business among the larger corporations. Many of the present small manufacturers of fly spray would be unable to finance the equipment necessary for the charging of these bombs.

In the light of the above facts, it would seem that the industry would not be warranted in adopting this method of application until the economic and dangerous factors involved can be overcome.

—Reprinted from Soap and Sanitary Chemicals, July, 1944.

Another View of Aerosol Efficiency

By **N. J. GOTHARD**, *Sinclair Refining Co.*

IF we are to believe everything we hear about new developments in store for us post-war, we are apparently headed for a marvelous age in which almost everything imaginable will be accomplished for us with the greatest of ease and the highest degree of refinement. There is no question but that great strides have been made in many lines under the pressure of war activity and there is no doubt but that many of these things promised for us will be realized.

Not the least of these, as far as we are concerned, is the progress which is being made in the insecticide business. Never has there been a time when so much publicity has been given to man's fight against insects. Between aerosol bombs and DDT, wherever one turns in the magazines and newspapers these days, one reads of the accomplishments that are being made. There is, of course, no question but that the aerosol bombs and DDT have accomplished wonders in their military uses, and certainly we cannot afford to ignore or overlook either in their post-war possibilities.

The aerosol bomb may be considered to be as yet in its formative stage. Many features remain to be investigated and developed. If all of these investigations and developments as to toxic materials to be used, the manner of handling and marketing, etc., are successful, the aerosol bomb may prove to be of the greatest value. Certainly everyone in the insecticide industry is interested in its development and hopes that it will eventually be as successful as some of the claims made for it.

Therefore, this paper has not been written in any spirit of criticism of the aerosol bomb or in any effort to minimize what eventually may be done with it. However, in the midst of all the publicity being given to it and the claims that are being made for it, it might be well to consider just where it stands today and what can be done with the present aerosol bombs in comparison with the conventional type of sprayer. Thus, in

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such work as we have done, we have not considered the use of DDT in the bomb because we know too little about DDT as a liquid contact insecticide and have no background of experience with it by which to judge its effectiveness in the aerosol bomb.

The formula as at present being used in the aerosol bomb is as follows:

	%
20% Pyrethrum Extract	2.0
Oil of Sesame	8.0
Freon	90.0
	100.0

This means then that for every gram of liquid dispersed by this bomb, 4.0 mgs. of pyrethrins will be dispersed. In a communication to the writer, Dr. Goodhue has stated that the pyrethrin content of this formula is too low to be very effective against flies and recommends the following formula:

	%
20% Pyrethrum Extract	4.0
Oil of Sesame	6.0
Freon	90.0
	100.0

It will be noted that this formula uses twice as much pyrethrum so that each gram dispersed will contain 8 mgs. of pyrethrins. However, one of the bombs which is being manufactured carries the following printed on the bomb:

"Kills mosquitoes, flies, cockroaches, bedbugs, spiders and other insects.

"Caution. This insecticide is very efficient. Only 4 seconds of spraying are required for a confined space of 1000 cubic feet."

In view of the publicity being given the present bomb, and not some theoretical bomb of the future, and in view of the claims made on this bomb itself, it seems fair to examine the efficiency of this formula, as well as the stronger concentration of pyrethrum recommended by Dr. Goodhue.

Unfortunately, due to delay in getting materials to us, there was not sufficient time to make an exhaustive examination of these aerosols, so that the information given herewith must be considered as more or less preliminary and indicative only of what we can expect from these bombs.

Considering first the commercial bombs as now being produced, we made two tests in a practical test room. This room contains 2500 cubic feet. Consequently, according to the directions on the bomb, this room should be sprayed for 10 seconds. In two tests, a 10-second spraying time delivered 44.4 and 43.7 grams of fluid. A chemical analysis of the contents of the bombs showed that they contained 0.214 per cent found impossible to get accurate results for pyrethrin II, but if we assume twice the pyrethrin I for total pyrethrins, we find that these bombs contained 0.412 per cent pyrethrins. Since they are supposed to contain 2 per cent of a 20 per cent pyrethrum extract, the theoretical figure for pyrethrin content is 0.4 per cent. Hence, it is shown that these bombs contained very close to the supposed amount of pyrethrins.

Then, in the two tests, delivering 44.4 and 43.7 grams of fluid, we estimate that we put into the room approximately 175 mgs. of pyrethrins. From 1000 to 1200 flies were introduced into the room before each test. Exposure of the flies to the insecticide was for 10 minutes, after which the insects still up were counted and those down were carefully picked up, counted, and held for 24 hours for determination of kill.

The knockdowns in these two tests were 84 per cent and 82 per cent, respectively, while the kills were 81 per cent in each test. The knockdowns in both tests were very slow. At the end of five minutes much less than half of the flies were down, and it was not until after the seventh minute that the knockdown became really effective. However, it is shown that the kill was effective on those flies which were knocked down.

Check tests were run in the same room using a conventional pyrethrum insecticide and a conventional sprayer for dispersion. The insecticide used contained 160 mgs. of pyrethrins per 100 ml. This is a good insecticide of the pyrethrum type and will show an AA test by the Peet-Grady procedure. It is, I think, generally considered by the industry that for effective spraying, one fluid ounce should be used per 1000 cubic feet. At this rate, in our room and with the insecticide of 160 mgs. pyrethrin content, we dispersed 118 mgs. pyrethrins in our tests. Following this procedure, we obtained knockdowns of 99 per cent and 98 per cent, respectively, and kills of 92 per cent and 91 per cent, respectively.

The knockdowns in these two tests were much more effective than with the aerosol bomb. Not only were they substantially complete, as compared with 84 per cent and 82 per cent with the aerosol bomb, but they were strikingly more rapid by comparison. Flies began to fall within the first minute of spraying and at the end of five minutes, the knockdown was substantially complete. Compared with this, the knockdown with the aerosol bomb was slow for five minutes and was not effective until after seven minutes had elapsed.

In a paper* by McGovran, Fales and Goodhue, they recommend, in tests in a Peet-Grady chamber, that a 15-minute exposure time be used because at the end of the 10-minute exposure time the flies were still being knocked down. It may have been satisfactory for their purposes to use a 15-minute exposure period, but this is scarcely practicable from the ordinary consumer standpoint. Every marketer of insecticides knows that, while the true efficiency of an insecticide is judged by its kill as well as its knockdown, the consumer judges an insecticide by its visible rate of knockdown. The average consumer knows little about the kill or about a Grade AA rating, but he does see immediately whether the flies come down rapidly after spraying or whether they are still in the air after ten minutes. If flies are not beginning to come down almost as soon as the spray is applied and if they are not down in ten minutes, he judges that the insecticide is not effective.

With reference to roaches, in each of the tests described, 20 female roaches were placed in glass Petri dishes which in turn were placed on a small table in the center of the room where the roaches were fully exposed to the aerosol fog. During exposure in the room the roaches became somewhat listless and slow in their movements, but in no case were any of them down and none were killed. If this aerosol will not kill roaches which are held so that they are fully exposed to the insecticide, it is difficult to understand how they can be killed when free to escape to their hiding places. Everyone knows that insects as elusive as roaches are difficult to kill and substantially every manufacturer gives instructions on his container that the insecticide should be sprayed in volume directly into their hiding

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- Large opening for quick refilling.
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PHOSPHOROUS PASTE

FOR ROACHES and RATS

SINCE 1874

J-O Phosphorous Paste is so compounded as to eliminate the hazard of fire and possesses advantageous qualities peculiar to itself. A properly made **Phosphorous Paste** such as **J-O** is absolutely safe to use. It cannot burn or set fire to other substances.

Phosphorous, however, remains basic in the compound because it is the most toxic chemical used in pest exterminating, being more toxic than arsenic, strychnine or thalium. Approximately one-tenth of a grain will kill a rat. Phosphorous is a slow poison, taking from 6 to 18 hours to kill. Due to its slow but positive action, the rat succumbs to this poison. He becomes very uncomfortable and, seeking fresh air and water, in most cases, leaves the premises and dies in the open.

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places. There are no such instructions in the case of aerosols and we are led to believe that mere release of the aerosol into a room will kill roaches. However, our results would indicate that roaches will not be killed even when exposed directly to the spray, to say nothing of if they are allowed to seek their natural hiding places.

In the foregoing tests it should again be pointed out that we used about 175 mgs. of pyrethrins in the case of the bomb and only 118 mgs. in the case of the sprayer. Thus, we used 48 per cent more pyrethrins in the case of the bombs, but obtained knockdowns some 15 per cent lower and kills which were 11 per cent lower. In addition it should be pointed out that the bombs had the benefit of the synergistic effect of oil of sesame, whereas the liquid insecticide used contained pyrethrins only without synergists. I do not know the degree of benefit conferred by the use of oil of sesame, but it seems apparent that the results of our tests would have been more disparent if the sesame had not been used in the bombs.

As I have mentioned, Dr. Goodhue has recommended a formula containing 4.0 per cent of 20 per cent pyrethrum concentrate for use against flies. Unfortunately, we did not have the opportunity to test this material in our testing room, but we did test it in the Peet-Grady chamber. Using our conventional pyrethrum insecticides, containing 160 mgs. per 100 ml. of pyrethrins, and using 12 ml. as the normal Peet-Grady dosage, it is apparent that we were introducing 19.2 mgs. of pyrethrins into the Peet-Grady chamber. Following the normal Peet-Grady procedure with this conventional insecticide we obtained a knockdown of 98 per cent and a kill of +18.

In order to introduce the same amount, 19.2 mgs., of pyrethrins from the aerosol solution, it is apparent that we should use 2.4 mgs. of the 4.0 per cent solution of 20 per cent extract. Using this amount and again following the Peet-Grady procedure, we obtained a knockdown of 83 per cent and a kill of +11. Here again the aerosol benefited by any synergistic action of the oil of sesame, which was not used in our conventional liquid insecticide.

Thus we show that, in a Peet-Grady chamber, and using the same amount of pyrethrins, the aerosol is 15 per cent less effective in knockdown and has a kill of +11 as compared with +18 for the conventional spray.

In summary, we find that the current aerosol bomb, as at present used, and which is claimed to be effective against flies and roaches is not as effective as the conventional sprayer. In a full scale room test, using 48 per cent more pyrethrins and with the benefit of a synergist, the bomb gave a knockdown 15 per cent lower and a kill 11 per cent lower. In order to equal the knockdown and kill obtained by the conventional sprayer, it seems evident that an excessive amount of pyrethrum must be used in the bomb to equal the kill obtained by the usual sprayer. We find further that the knockdown with the aerosol bomb is excessively slow, as well as ineffective, and would not be satisfactory to the average user.

Further developments of the aerosol bomb may remove these objections, particularly if the newer and possibly more effective toxics are successfully developed. Some of these developments may be under way, of which we are unaware, but it would appear to us that the present aerosol bomb, using pyrethrum, is not as effective as the conventional Grade AA insecticide applied with a sprayer.

In closing, I should like to mention that all of the entomological testing work was done by my coworker, A. G. Grady.

*Testing Aerosols against Houseflies, McGovran, Fales and Goodue. Soap and Sanitary Chemicals, Vol. XIX, No. 9, September, 1943.

—*Reprinted from Soap and Sanitary Chemicals, July*, 1944.

Toxicity of DDT to Bedbugs, Cockroaches, the Mexican Bean Beetle and Housefly Larvae

E. R. McGOVRAN, H. H. RICHARDSON
and P. G. PIQUETT

BEDBUG SPRAY TESTS.—DDT in deodorized kerosene was found to be highly toxic to bedbugs, **Cimex lectularius** L. and C. **hemipterus** F., when applied directly as a contact spray by the turntable method. The bugs were confined in open glass dishes with filter paper on the bottom. At a concentration of 0.18 per cent (weight per volume) in deodorized kerosene DDT was as toxic as the same concentration of pyrethrins, although the lethal effect was not complete until 2 to 4 days after treatment as compared with 1 day for pyrethrum. The DDT sprays tested appeared to have little effect on bedbug eggs under the conditions of these tests.

Roach Spray and Powder Tests.—In preliminary tests by the pendulum method a deodorized-kerosene spray containing 2 per cent (w./v.) of DDT applied as a contact spray directly to the dorsal surface of German cockroaches, **Blattella germanica** L., was less effective than a deodorized-kerosene spray containing 0.4 per cent (w./v.) of pyrethrins. A similar DDT spray was ineffective against American cockroaches. **Periplaneta americana** L., by this method. When this 2 per cent DDT spray was tested by confining American roaches in a rising mist of spray, it showed appreciable toxicity but was less effective than a similar spray containing 0.2 per cent (w./v.) of pyrethrins. The roaches were not knocked down rapidly by the DDT sprays.

Insecticidal powders were tested against roaches in the laboratory by scattering weighed amounts uniformly over the floor of glass cylinders, which were lightly oiled to confine the insects placed in them. A proprietary powder containing 3 per cent of DDT caused mortalities of German roaches approximately equal to that obtained with a pyrethrum powder containing 0.66 per cent of pyrethrins. However, the DDT was less effective than the pyrethrum against American roaches.

In addition a dust containing 10 per cent of DDT in pyrophyllite was tested in comparison with a finely ground commercial grade (95 per cent) of sodium fluoride. The DDT powder was less effective on both American and German roaches than the sodium fluoride, but on the basis of the amount of toxicant in each powder the DDT was more effective.

Tests with Mexican Bean Beetles and Housefly Larvae.—DDT at 8 pounds to 100 gallons of water was applied in the laboratory to excised bean leaves by the spray-tower method. Acacia at 0.8 pound per 100 gallons was used as the wetting agent. As soon as the leaves had dried, they were placed in unsprayed cages and infested with 10 young fourth instars of the Mexican bean beetle, **Epilachna varivestis** Muls. The mortality in 6 days was 45 per cent. One pound of powdered derris root containing 4.8 per cent of rotenone in 100 gallons of water cause 67 per cent mortality in the same time.

Samples of housefly breeding media weighing approximately 23 grams each were treated with insecticide and infested with third-instar houseflies, **Musca domestica** L. The culture was then held until the adults emerged. In samples treated with 60 and 30 milligrams of DDT 88 and 77 per cent of the larvae died, as compared with 92 per cent when 60 milligrams of borax was added to a similar culture. Thiourea is much more toxic, for only 7.5 milligrams added to each 23 grams of media caused 92 per cent mortality.

—*Journal of Economic Entomology, February*, 1944.

Notice

We are glad to print personal items of interest. Send us interesting or newsy items about yourself or your family. This magazine is for the pest control industry, and news about YOU is interesting to the rest of us.

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This new super strong CONCENTRATE may be diluted with 12½ parts Fuel Oil, Kerosene, or even Crank Case drainings to make the proper strength (over 5%) treating solution.

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51 JAMES STREET MONTCLAIR, N. J.

NOW—MORE THAN EVER BEFORE YOU NEED THE FAMOUS ACME GAS MASK

War has drawn heavily from the personnel of the Pest Control Operators. Those left behind to fight pests are being burdened with extra work. To speed up victory over home front pests, longer working hours have been necessary.

The Acme No. 4 Gas Mask with its Flat, Wide, FULL VISION Safety Glass Lenses is enabling Operators to speed up their work and still maintain efficiency. The Acme Canister protects against any Fumigating Gas, or Combinations of Gases. Always specify Acme Masks for Safe and Dependable results.

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VOX POP

Economics Not a Factor?

WRITING in the August issue of Pests on the subject of "Universities and the Pest Control Industry" Dr. M. A. Stewart asserts that "the staff members of a state or city university or college [sponsoring a regional pest control conference] are not at all interested in or concerned with the economical advantage of the individual pest control operator or the pest control industry." However, it is of interest to note that there are universities, including his own University of California, sponsoring poultry schools, horticultural schools, and the like, which definitely are intended to aid the poultryman, horticulturist, etc., to do a better job and increase his personal income.

Dr. Stewart's article, on the other hand, contains not only a clear-cut analysis of the reasons for the rapid rise in the number of regional pest control conferences but also an able discussion of the philosophy which underlies their sponsorship by tax-supported schools. With much of the thesis he underwrites I am in substantial agreement.

Army V-Mail Service*

Mail from home, builder of morale in battle areas, goes to United States soldiers at overseas installations from the Arctic to the Antarctic at the rate of over 20,000,000 pieces a week, and approximately one-third as much comes back from American fighting men in all quarters of the globe to their home folks.

Complete postal operating units with all necessary equipment have accompanied every American expeditionary force in this war. They operate in every theater overseas, from rear echelons to the front lines. And every officer and enlisted man who handles the mails had a background of experience in the United States civil postal system before entering the Army, thus assuring the highest degree of efficiency.

V-Mail has been a large factor in the success of the service. Approximately twenty per cent of all mail now going overseas is V-Mail. Its growth since it began June 15, 1942, is illustrated by the fact that during the first full month of operation, July, 1942, a total of 115,397 micro-filmed V-Mail pieces were sent to troops abroad while the volume for mail of that type in March, 1943, amounted to 7,172,128 pieces. Facilities were established as rapidly as possible until V-Mail is now available to soldiers at all overseas installations, including North Africa, where stations were established at two points April 15, 1943.

Use of this type of mail has speeded up deliveries tremendously. Since 1,000 such letters on film weigh but four ounces, a single sack of them is equivalent to 37 full postal sacks of ordinary mail. Transport may be made by air, reducing the time of transit by days and even weeks.

Safety and speed are the outstanding advantages of V-Mail. Contrary to an impression gained by some individuals, V-Mail entails no greater lack of privacy than other mail, since all mail leaving the continental United States or coming into the country must be censored for reasons of military security.

Another service available to soldiers and their correspondents is the transmission of money orders. Nowadays soldiers may send and receive money by this facility. Records show that several million dollars are sent home every month by soldiers abroad. Safety is an added advantage. Cash may be lost if a ship sinks, but the purchaser of a money order is always assured that payment can be made.

Parcels from home continue to aid the morale of the soldier in foreign lands. Under present regulations, he may receive first class mail weighing up to eight ounces without special permission. He may get a wrist watch or cigarette lighter for instance. If, however, he wishes an article of greater weight he must make a request and have it approved by his battalion commander or higher military authority. If the permission is granted, a package of not more than five pounds in weight and not more than fifteen inches in length and thirty-six inches in length and girth combined may be sent to him.

Letters from soldiers sometimes reach home more quickly than those which are written to him, reach him. The chief reason is that greater space is available on homebound carriers. This is particularly true of airplanes, but applies also to ships. There is not the same urgent demand for cargo space on the return flight or voyage as there is when ships and planes must transport personnel and war materials to the fighting fronts.

A new service, already established within one theater of operations overseas, adds to the speed with which mail can be distributed to soldiers there. Army Postal Service crews operate on airplanes. There they sort the mail for distribution to the various units just as railway mail clerks, working on trains in the United States, sort mail for the communities they serve.

New equipment for efficient mail handling is constantly being devised. For example, the Quartermaster Corps in cooperation with the Army Postal Service has developed two new cases designed to facilitate distribution to soldiers in combat areas.

One is intended for use where no shelter is available. The case, made of wood, has a cover which drops and forms a desk at which the mail clerk can sort the letters and pigeonhole them for distribution. The other is a collapsible wood and canvas case equipped with chains for hanging from the ridge pole of a tent or the cross beam of a hut. These cases are expected to supplant homemade equipment built by the mail orderlies.

But despite every facility and all the most careful planning and preparation, there are circumstances that involve unavoidable delays in getting the mails to their destinations. One is the time necessitated by military censorship. On occasion, too, it becomes necessary to hold or impound, temporarily, mails for certain areas and certain units of the Army in order that absolute secrecy may be maintained concerning troop movements, to overseas theaters and within them.

Another factor is that the bulk of overseas mail of necessity must be transported on surface vessels. Mails may pile up at ports while convoys are being assembled and between the sailing times of convoys. No backlog of mail for any designated area, however, has been permitted to remain when a convoy sailed.

United States mails for American soldiers are carried not only by American vessels but also by merchant ships of all the United Nations. For this reason, practically every time a United Nations ship is sunk by the enemy, quantities of United States mail are lost. During the first three weeks of March, 1943, several million pieces of mail were destroyed through ship sinkings. The mail had been en route to some half-dozen overseas areas in widely separated parts of the world.

When micro-filmed mail is thus lost, although it can be replaced and forwarded, time is required for receipt of information that the carrier has been lost and for reprocessing of the letters.

A time lag also results from incorrect or insufficient addressing of mail. A continuing count made at ports shows that more than ten per cent of all overseas letters fall into this category. A locator unit is stationed at every port to check for correct addresses. The efficiency of these units is attested by the fact that 97 per cent of all this poorly addressed mail is ultimately forwarded to the proper destination. But valuable time has been lost in the process. Only when the soldier's full name, rank, Army serial number, service organization and Army Post office number are used is it possible to accord the most expeditious handling to an individual piece of mail.

**Information apropos Navy, Marine, and Coast Guard V-Mail appeared in August Pests* (pp. 4 & 5).

PYRETHRUM

The following announcement, apropos the current and near-by pyrethrum situation, was recently submitted to the trade by Russell B. Stoddard, Dodge & Olcott Company, N. Y.:

It would appear to be fairly certain that the pyrethrum supply situation during the fall and winter will be better than in a long time. It is possible, though by no means certain, that the available supply may exceed the military requirements to a degree and permit the diversion of some portion of the pyrethrum to agricultural and other of the more essential civilian requirements. This is only a possibility, and it seems highly improbable that any amount thus made available will cover normal demands.

Taking the optimistic view of the situation, we can foresee the possibility that supplies of pyrethrum for agriculture and for certain civilian uses will be much more nearly adequate than in a long time, but by no means sufficiently adequate to justify the abandonment of end use restrictions or of the necessarily highly complicated procedure of allocations.

Additional Patents Relating to Pest Control

By DR. R. C. ROARK.

2, 345,891 (Apr. 4, 1944; appl. Septemebr 30, 1941). SYNERGISTS TO AEROSOL INSECTICIDES. William N. Sullivan, Washington, D. C., and Lyle D. Goodhue, Berwyn, Md.—Claude R. Wickard, as Secretary of Agriculture of the United States of America, and to his successors in office.—An insecticide in aerosol form comprises a solution containing essentially 99.9 to 90 parts by weight of ortho-dichlorobenzene and 0.1 to 10 parts by weight of oleic acid, lauric acid or myristic acid.

2, 345,853 (Apr. 4, 1944; appl. September 9, 1940). POCKET SPRAY DEVICE. Samuel L. Margolies, Brooklyn, N. Y.

2,345,854 (Apr. 4, 1944; appl. September 10, 1940). POCKET SPRAY DEVICE. Samuel L. Margolies, Brooklyn, N. Y.

2,347,267 (Apr. 25, 1944; appl. October 28, 1941). INSECT EXTERMINATOR. Eddie R. Jowers, Swansea, S. C.—This machine is designed to spray insecticide upon cotton or tobacco plants.

2,345,894 (Apr. 4, 1944; orig. appl. Sept. 30, 1941. Divided and this appl. Jan. 7, 1944). SYNERGISTS TO AEROSOL INSECTICIDES. William N. Sullivan, Washington, D. C., and Lyle D. Goodhue, Berwyn, Md.—Secretary of United States Department of Agriculture—An insecticide in aerosol form comprises oleic acid and an agent chosen from the group consisting of methyl chloroacetate ethyl dichloroacetate, beta-chloroethyl chlorocarbonate, and beta-chloroethylacetate, **epichlorohydrin**, and tetrachloroethane.

2,345,895 (Apr. 4, 1944; orig. appl. Sept. 30, 1941. Divided and this appl. Jan. 7, 1944). SYNERGISTS TO AEROSOL INSECTICIDES. William N. Sullivan, Washington, D. C., and Lyle D. Goodhue, Berwyn, Md.—Secretary of United States Department of Agriculture—An insecticide in aerosol form comprises ortho-dichlorobenzene or 3-chloroacenaphthene or 2-chlorofluorene and salicylic acid.

2,345,899 (Apr. 4, 1944; orig. appl. Sept. 30, 1941. Divided and this appl. Jan. 7, 1944). SYNERGISTS TO AEROSOL INSECTICIDES. William N. Sullivan, Washington, D. C., and Lyle D. Goodhue, Berwyn, Md.—Secretary of United States Department of Agriculture—An insecticide in aerosol form comprises carbazole and an agent chosen from the group consisting of diglycol laurate, propylene glycol oleate, propylene glycol laurate, sorbitol laurate, monoglycol laurate, sulfonated naphthalene, and lauryl sulfate.

2,345,897 (Apr. 4, 1944; orig. appl. Sept. 30, 1941. Divided and this appl. Jan. 7, 1944). SYNERGISTS TO AEROSOL INSECTICIDES. William N. Sullivan, Washington, D. C., and Lyle D. Goodhue, Berwyn, Md.—Secretary of United States Department of Agriculture—An insecticide in aerosol form comprises 3-chloroacenaphthene or 2-chlorofluorene or carbazole and myristic acid.

2,345,900 (Apr. 4, 1944; orig. appl. Sept. 30, 1941. Divided and this appl. Jan. 7, 1944). SYNERGISTS TO AEROSOL INSECTICIDES. William N. Sullivan, Washington, D. C., and Lyle D. Goodhue, Berwyn, Md.—Secretary of United States Department of Agriculture—An insecticide in aerosol form comprises carbazole or 3-chlorodibenzofuran or thiocresol and spermaceti.

2,345,901 (Apr. 4, 1944; orig. appl. Sept. 30, 1941. Divided and this appl. Jan. 7, 1944). SYNERGISTS TO AEROSOL INSECTICIDES. William N. Sullivan, Washington, D. C., and Lyle D. Goodhue, Berwyn, Md.—Secretary of United States Department of Agriculture—An insecticide in aerosol form comprises carbazole or thiocresol or 3-chlorodibenzofuran and salicylic acid.

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Keeps Pigeons, Starlings and Other Birds from Buildings

10 lbs. $6.00 25 lbs. $13.50 100 lbs. $45.00

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For Rats, Mice and the Large Brown and Black Roaches

10 lbs. $4.25 25 lbs. $9.00 100 lbs. $32.50

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FOR RATS AND MICE

(Just Dilute With Water)

Per-Mo Rat and Mice Liquid can be used as a drink or can be mixed with any food and used as a bait.

ECONOMICAL TO USE

Send $1.00 for a 16-oz. Bottle CONCENTRATE RAT & MICE LIQUID. Postage Prepaid.

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3729 Virginia Ave. Dept. R Kansas City, Mo.

Fumigation—Pest Control

By **JOHN F. LYNCH,** *Chief Inspector, Department of Health, Newark, N. J.*

The use of Hydro-cyanic gas fumigation is so efficient for complete extermination of vermin and rodents, that we consider it essential especially in commercial food protection. For that reason, an Ordinance was adopted a few years ago, which requires the licensing of all such fumigators, and individual permits with supervision of this department of each job. A written examination is required to secure a license. The merit of this effort is proven by several recent accidental deaths in other parts of the State. During the past year, this division supervised more than 400 fumigations, and made 258 investigations of rodent and insect conditions.

One of our largest Hydro-cyanic acid gas fumigations this season was the seven housing projects, consisting of 2,736 families, approximately 7,000 persons. Forty-two working days were required with 65 apartments fumigated per working day.

These families were required to vacate premises for 28 hours, taking only enough clothing and bedding necessary, to prevent reinfestation upon returning. Forty-six cases of communicable diseases were removed to the Isolation Hospital. Some minor cases of contagion were allowed to go with their families where no susceptibles were in the families visited. Our greatest problem was the care of sixteen bed-ridden adult patients. By arrangements with the City Hospital and Infirmary at the Alms House, these patients were kept until three days after premises were released by this Department.

Fumigation preliminaries—At 8 A.M., buildings would be turned over to the fumigator; sealers would close and lock windows, open bureau draws, open closet doors, etc. The inspector would familiarize himself with the layout of the rooms, see that all living plants, foods, aquarium fishes, etc., were removed, and see that all openings where gas might possibly escape, were properly sealed. By 10 A.M., fumigators would be ready to release Hydro-cyanic gas, following another final check up.

All entrances were placarded and all doors locked except fumigators' exit door. After fumigators made their exit, Health Department safety locks were placed over locked doors and a watchman left in charge with proper instructions.

After seven hours exposure, all doors and windows were reopened for start of ventilation. Three hours after start of areation, the beating of mattresses and padded furniture was started. At 10 A.M., the following day, all bedding, upholstered furniture and closets were tested with Methyl-orange Mercuric Chloride test papers, and if no HCN was present, buildings would be turned over to tenants at 12 noon by this Department.

Over 5,600 lbs. of Hydro-cyanic acid gas was used (Zyklon Discoids 40 oz. containers). Total buildings fumigated, 95. Total cubic air space, 9,005,000 cu. ft. Dosage, 10 oz. per 1000 cu. ft. This Department would like to thank fumigators, sealers and watchmen for their fine cooperation with this Department.

The following is a tabulation of the activities of 1943.

Investigations, Rodents and Insects	258
Written Notices Served	152
Total Number Fumigations	419
Demolition of Structures Inspected—15. Fumigated Cy-an-o Gas	8
Occupied Dwelling—Hydro-cyanic Acid Gas	115
Factories, Warehouses, Food Plants—Hydro-cyanic Acid Gas	10
Warehouse Chamber Fumigation—Chloropicrin	26
Fumigatorium—Hydro-cyanic Acid Gas	13
Vacant Lots, Emergency Fumigation Hen.—Chloropicrin	92
Rummage Sales, Formaldehyde	105
Food Trucks, Freight Cars—HCN, Methyl Bromide, Chloropicrin	44

—From Health Report for the City of Newark, 1943.

You Are Driving Customers Away!

Many firms, which have spent large sums to attract the public, now are driving potential postwar customers away by allowing irritating habits and customs to continue uncorrected, says a report issued by the Domestic Trade Department of the Chamber of Commerce.

The report, titled "When the Alarm Clock Rings," declares the public right now is deciding what business houses to avoid when the war is over, and is basing its decision on treatment received in this era of personnel, equipment and material stringencies.

Despite wartime annoyances, the report urges executives to extend the same courtesies that were "musts" during lean depression years, when patronage was needed and it was a buyers' market.

Curt letters, brusque telephone operators, inattentive sales people, bad-mannered receptionists and waits in the reception room beyond the time set for an appointment were listed as things customers will remember after the war.

"Put yourself squarely in the other fellow's shoes," the report advises, "and treat him as in a time when customers were few. Remember there may be another period when there will be more goods than money."

Interested executives and sales managers may obtain copies of the "Alarm Clock Report" by telephoning the Chamber—PR. 3431, Ext. 274. —P.C.O. News.

—Cartoon Courtesy Aromatic Products Inc., N. Y. C.

WHAT'S NEW IN PEST CONTROL-PERSONALS

DDT.—"Bill" Buettner, representing the War Production Board and J. Edwin Sameth representing the Research Project Committee of the National Pest Control Association, attended a four-day course at the Orlando, Florida Research Laboratories of the Bureau of Entomology and Plant Quarantine, August 14-17. The principal subject for consideration was DDT. It is expected that certain phases of the studies and observations will be reported at the 12th Annual Meeting of the NPCA in Chicago, Ill., October 23-24-25.

RAY BOLGER, musical comedy star, tells this one: Two horses were talking together after a race. They were old and had seen better days, but were bragging about their exploits. One said, "You know in my hay day, I won the Brooklyn Handicap in a walk and I broke every record at the Viaduct."

The other horse said, "Huh, that's nothing, before I became a selling plater I walked away with the Belmont Handicap."

A little dog, listening, interrupted, "You two old nags make me sick."

Both horses looked down in amazement and one muttered, "What do you know, a talking dog!"

REGENT EXTERMINATING CO. (N.Y.) whose president, Nathan Sherman, died in August, will continue to be managed by IRVING KRAUSS who has served in that capacity for a number of years.

PHEW!—In Stockbridge, Mass., Mrs. John F. Decker argued that no woman should be expected to put up with a man who kept six skunks in the coalbin. She got the divorce. —*Time.*

WIZO
RAT GLUE BOARDS

Eliminate Use of Poison!
Require No Bait!

A practical and economical way to rid buildings of rodent pests! No hazards of poisoned bait . . . or of decomposition! Easy to prepare! Just place WIZO Rat Boards near rat hole or form a runway next to walls. Fasten boards to floor to prevent pulling away. Rodents are caught firmly the moment they step on the boards.

WIZO RAT GLUE can be obtained in quantities for preparing your own boards. Write for complete particulars.

ELKAY PRODUCTS CO.
323-27 West 16th St. New York, N. Y.

THE GAG OF THE MONTH as told by Eddie Garr, musical comedy star: "Went on a picnic today and boy, were those mosquitoes terrible. Two of them landed on my arm and the first mosquito asked, 'How many?' The other one said, 'Fill her up. I got a C card.'"

DR. LOUIS G. GEMMELL is now associated as entomologist with the American Cyanamid & Chemical Corporation at its New York offices. Among his duties will be the development of new insecticides and fungicides for the agricultural and household fields.

THE COMMERCIAL CHEMICAL CO. of Los Angeles, Calif. has moved to their factory—address 3051 Rosslyn St.

SOLID FOOD—In Big Sandy, Mont., A. H. Olson appeared with a dead rattlesnake and a story. The snake, he explained, swallowed a mouse. Then the mouse killed the snake by biting a hole in its throat. —*Time.*

GOVERNOR EARL WARREN of California recently announced the appointment of L. W. CHRISTENSEN, PCO of East San Diego, and CLIFFORD HODEL, PCO of Los Angeles, to fill vacancies on the State Structural Pest Control Board, with terms to expire January 15, 1947 and January 15, 1948, respectively. Both are members of the Pest Control Operators of California, Inc.

DR. WILLIAM BONAR BELL, Chief of the Division of Wildlife Research in the U. S. Department of the Interior, retired on August 1 after 28 years' service. He entered the Bureau of Biological Survey of the U.S.D.A. in 1916 and is the author of many reports and magazine articles.

C. J. DUMAS TO HEAD INSECTICIDE DIVISION FOR GEIGY COMPANY.—Geigy Company, Inc., of N. Y., announces the appointment of Charles J. Dumas as manager of its Insecticide Division.

Prior to his new appointment, Mr. Dumas was manager of the Insecticide and Fungicide Dept. of Rohm & Haas Co. Altogether, he has had a background of twenty-five years in the insecticide industry, covering all phases from marketing to application in both the household and agricultural fields. For Geigy, he will take over at once management of its activities in Gesarol, Neocid and other phases of the GNB-A—DDT family, as well as all other insecticidal interests of the firm.

HAEUSSLER NEW CHIEF OF INSECT PEST SURVEY AND INFORMATION.—The Department of Agriculture has named Gilbert J. Haeussler chief of the Division of Insect Pest Survey and Information in the Bureau of Entomology and Plant Quarantine, Agricultural Research Administration.

This Division conducts insect pest surveys, and reports on insect conditions to help farmers and insecticide companies control serious crop pests. It also prepares information and publications on research, control and regulatory work in entomology and plant quarantine activities.

Dr. P. N. Annand, chief of the Bureau, said that Mr. Haeussler will succeed James A. Hyslop, who is retiring after 38 years as an entomologist in the Department of Agriculture, and who developed the method of pest survey now in use.

Mr. Hyslop, who is retiring voluntarily at the age of 60, has been in charge of the Insect Pest Survey Service since its organization in 1920, and of the Division of Insect Pest Survey and Information since its creation in 1934. Under his leadership the Insect Pest Survey service conducted in cooperation with State entomologists and cooperating local agencies, has provided reports on current insect conditions throughout the country, and has accumulated much useful information on the distribution and spread of crop pests.

10,000,000th INSECT BOMB PRODUCED BY WESTINGHOUSE.—The ten millionth "insect bomb"—the pint-sized insecticide dispenser which guards soldiers in the tropics from insect-carried disease—rolled from the production lines of the Westinghouse Electric and Manufacturing Company recently, it was announced by H. J. Burgess, assistant works manager of the East Springfield plant.

The "insect bomb" is about the size of an ordinary soup can and weighs a little more than a pound when filled with insecticide. Each "bomb" contains enough insecticide spray to "de-bug" 150 Army pup tents or 50 giant bombers.

Thousands of these metal dispensers are being shipped daily to men in the service in the South Pacific, North Africa, and other tropical areas, where America's fighting men use them to kill mosquitoes, flies and other disease-spreading insects in tents, barracks, tanks, airplane cabins and even in fox holes.

The insecticide, a war-born invention, was developed by the Department of Agriculture, and the throw-away container was designed by Westinghouse in collaboration with the office of the Surgeon General of the United States Army.

ROSE EXTERMINATOR CO.—Because of the original and refreshing style of its direct mail advertising—a form of publicity it has employed exclusively—and successfully—since 1918—Charles Menard's Rose Exterminator Co. (San Francisco) received an editorial accolade in a recent issue of "Sales Management." This firm, states the publication in effect, has achieved a nice blend of the light and the humorous with the tactful and the educational in its public relations material, getting its sales message across most persuasively. Attention is also called to "Pest Patrol News", a company

WANTED
METHYL BROMIDE
FUMIGATION ENGINEER

Nationally known, fast growing chemical company has attractive opening for a Fumigation Engineer with practical experience in the use of Methyl Bromide, Carbon Tetrachloride, Carbon Bisulphide, etc. Must be able to demonstrate and sell and free to travel extensively. Our employees know of this advertisement. Address in confidence, giving resume of experience and compensation expected. Address Box 200, Pests, 512 E. 14th St., Kansas City, Mo.

paper launched this year by Mr. Menard and his associates. Describing this "Sales Management" says: "While it has a definite educational slant, it retains the light and comic treatment which has characterized the company's advertising. It has three pages of items about pests, facts, fallacies, humorous experiences, pest control hints, questions and answers, and one page carrying the company's advertisement. One section of the paper is amusingly called 'Rat Tales'."

PLASTICS ON THE JOB — BOXCAR FUMIGATION—Because of the greatly increased shipment of foodstuffs and their treatment to prevent the development of infestation, The Dow Chemical Company has announced the use of translucent Saran tubing as applied to the fumigation field. The applicator is manufactured by the Arrow Products Company of Carlstadt, New Jersey, and this method allows fumigation from outside the car, simply by placing one pound cans of methyl bromide in the applicator, which punctures the can, allowing the gas to escape.

This simplified method allows overnight fumigation, a time-saving factor of importance when vast quantities of vital foodstuffs must be protected against infestation.

The photo above shows the plastic tubing applied to the applicator. The end of the tubing is plugged with an ordinary bolt with two small holes drilled on the sides of the tubing near the plug, which allows the gas to escape to either end of the car above the load. This apparatus may also be used in vault fumigation. Saran tubing has proved to be highly adaptable to this type of fumigation because of its chemical resistance and its flexibility, the latter simplifying installation.

R-DAY IN NEW ORLEANS MAKES IT ROUGH ON RATS.—New Orleans, Aug. 9. —New Orleans observed "R-Day" today with a concerted drive to poison its growing rat population. Citizens were asked to put out 160,000 packages of poison bait and to keep refuse cans tightly covered so that rodents would be forced to eat the bait.

—*N. Y. Post.*

THE MOSQUITO ESCAPED.—Salt Lake City, Aug. 9.—The mosquito buzzed in through the car window and four-year-old Jerry Lee Moore opened the door to shoo it out. His mother stopped the car quickly, picked up Jerry, who was treated for bruises.

Nobody knows what happened to the mosquito.

—*N. Y. Post.*

STAFF OF DEATH RECOVERED — Boston, July 28. — Boston's police force breathed easier today after a loaf of bread, missing since last night, had been found —a loaf of bread which the owner reported had been dosed with rat poison. A Boston Elevated Railway employee found the bread in the car in which an absent-minded patron had left it.

THE AGE OF THE ANIMALS.—Three- to five-hour delays in transmission of papers in the pneumatic tubes of the Brooklyn Police Department baffled investigators for a week. Finally they were traced to a mouse.

SANIT, a liquid sanitizing agent for textile fabrics and other materials, is not significantly repellent to vermin, according to a recent declaration by the Federal Trade Commission. The system in which Sanit is used was attacked by the FTC in a charge against Sanitized, Inc., which makes the fluid; and the U. S. Process Corp. and Morgan Laundry Service, Inc. which exploit the process, among others.

FUMIGATION KILLS APARTMENT TENANT.—Overcome by fumes from a fumigating preparation being used in his apartment at 335 W. 70th St., Frank Bussie, Jr., 36, died yesterday in St. Bernard's Hospital.

EARLIER NAZI 'ROBOTS' WERE POTATO BEETLES. — London.—The Germans used potato bugs as a forerunner of the V-1 flying bomb, a scientist of the Ministry of Agriculture said today. He said German planes dropped Colorado beetles in an effort to damage the 7,000,000-ton British potato crop.

Odd specimens of the beetle, prevalent in Germany, were discovered in southern England.

CASE OF POISON REPORTED LOST.— Loss of a black composition box containing an assortment of poisons used in the extermination business was reported to police yesterday by James Shufelt, 467 Hewitt St., an employe of the City Exterminating Co., 324 Broadway.

Shufelt said the case contained phosphorus, arsenic and ant jelly, all poisons, a loaf of bread, three knives and a pair of gloves. The loss, he reported, was somewhere around 1150 Broadway, where he was working Wednesday.

Meanwhile, the exterminating firm asked police that proper precautions be taken today and tomorrow at six addresses where fumigation will be in progress. They are at 511 Hinman Ave., 9 a. m. today; 17 Briggs Ave., 10 a. m. today; 589 West Ave., 11:30 a. m. today; 330 Katherine St. and 27 Box Ave., both at 9 a. m. tomorrow, and 193 Rodney St., 11 a. m. tomorrow.

Fumigation will last four hours.

—*Buffalo Courier-Express.*

A new insecticide laboratory for biological and chemical testing and control of Thanite has been placed in operation at Brunswick, Ga., by Hercules Powder Co. J. D. Rebstock has been named supervisor and put in charge of all testing activities.

HEAD LICE QUICKLY KILLED BY NEW CHEMICAL FORMULA.—New applications of a formula based on the synthetic insecticide known as Lethane, recently called "amazingly effective" in killing head lice, now promises to eliminate war-born lice plagues of this pest which have struck as much as 50% of the women and children in crowded European cities. This liquid louse killer is known as Lethane, and mixed in special formulas containing kerosene makes possible the purging of whole communities of headlice infestations at a cost of less than half a cent a head, according to a recent press release.

In the control of head lice, the chief difficulty is to prevent treated heads from becoming reinfested. If a "lousy" person is admitted to clean surroundings, the infestation spreads rapidly. Many older insecticides kill the lice but do not destroy the 'nits' or louse eggs. Insecticide formulas based on Lethane proved highly effective in destroying these eggs. The insecticide is applied to the scalp at several spots with dosages of from one to two teaspoonfuls, massaged into the roots of the hair and allowed to remain for ten days without washing—thus reducing chances of reinfestation and 'proofing' the hair against future attacks, states the article.

PUBLICATIONS ON DDT.—A list of publications on 2,2-bis(parachlorophenyl)-1, 1,1-trichloroethane (DDT) from 1874 to April 30, 1944, inclusive, has been prepared by R. C. Roark, Bureau of Entomology and Plant Quarantine, U. S. Department of Agriculture, as a 12-page mimeographed bulletin that lists 174 publications.

Calling the secretary's office recently after a check-up for several days at a hospital was PETE BOHMAN. He's O.K., which is good news, indeed.

MONSANTO TO START VOLUME PRODUCTION OF DDT.—The Monsanto Chemical Company announced on August 15 that about September 1 it will begin volume production of DDT, insecticide chemically known as dichloro-diphenyl-trichlorethane and principally used by the armed forces, at its John F. Queeny plant in St. Louis.

Except for a small quantity devoted to scientific experimentation, the company's entire DDT output at present is channeled to meet military requirements. Allocations for experimental uses, it was said, are so small in size and weight a child could carry one month's supply.

GERMANS STUDYING VERMIN—DNB said yesterday that a "research association for combatting vermin" had been established in Germany. Declaring that "the methodical and successful combatting of unhygienic vermin such as lice, bedbugs, fleas, mosquitoes, rats, mice, etc., is an important task in wartime," the dispatch said that the association had the job of providing "a scientific basis for the biology of vermin and methods of combatting them" and would "examine all means used for the latter purpose." The dispatch was reported by United States Government monitors, according to the N. Y. Times.

CHRISTMAS OVERSEAS MAIL MAY BE POSTED SEPT. 15—The mailing period for Christmas packages to service men overseas will begin Sept. 15 and end Oct. 15. To assure delivery in time for the holiday, it is urged that relatives and friends sending gifts to persons in the armed forces begin to mail their packages on the opening day.

The rules governing Christmas mailings, say parcels must not exceed five pounds and must not be more than fifteen inches in length or thirty-six inches in length and girth combined. They should be marked "Christmas parcel" so that they may receive special attention to insure their arrival before Dec. 25.

A NOTE FOR THE PIED PIPER: The soundless dog whistle provides ample proof to the man in the street that animals hear sounds inaudible to humans. But experiments at Harvard disclose that the hearing of rats ranges as high as 40,000 cycles—more than six octaves above middle C.

LIKE SERGEANT SERGE ANT — A grain of suspicion still lingers in the mind of a young woman whose hostess at a recent cocktail party introduced a Royal Air Force officer as Lieutenant Lou Tennant. No such double-talk confusion is possible in England, where Lou Tennant is a Leftenant.

Local Organization News

Major Cary Addresses Pest Control Operators of Washington (D.C.)

At a meeting of the Pest Control Operators of Washington on July 27, Major O. H. Cary, Jr., of the District of Columbia Health Department, outlined a program of effective cooperation in rat control between the Health Department and the PCO. Touched upon in his talk were such essentials of successful rat control as: (1) the principles of survey, (2) sanitation, (3) ratproofing, (4) reinspection and maintenance services, etc.

Chairman T. F. Crosby then called on Mr. Buettner who complimented Major Cary on his sensible approach to the manifold problems of rat control and urged greater cooperation among sanitary inspectors of the Health Department and PCOs. Scarce materials, including rat baits, were also discussed by him.

Temporary co-chairman of the evening was Napoleon Silver. It was voted to dispense with the August meeting. Bill Church and Vernon E. Thomas were appointed temporary co-chairmen for the next meeting of the group to be called at their discretion. J. R. Fain was appointed to continue as treasurer pro tem.

Present at the meeting were:
P. Calvert Cissel, American Disinfectant Co.
Paris M. Brickey, District Termite Control Company.
P.M. Exterminating Co.
Wm. S. Church, No-Wonder Rat Exterminating Co.
Ray C. Frederick, Termite Engineering Co.
J. R. Byrne, Apex Exterminating Co.
O. H. Cary, Jr., D. C. Health Department.
Larry Shaw, Exterminating and Chemical Service.
J. R. Fain, Own Disinfectant Co.
Johnson Gaskins, Own Disinfectant Co.
John C. Mitchell, Western Exterminating Co.
N. Madden, Arlington Exterminators.
W. B. Walton, Western Exterminating Co., Inc.
N. D. Silver, The Silver Brothers.
T. F. Crosby, Exterminating Service.
Wm. O. Buettner, Secretary, NPCA.
V. E. Thomas, Action Pest Control.

—Report Submitted by Calvert Cissel.

Directors of Pest Control Operators of California, Inc. Meet

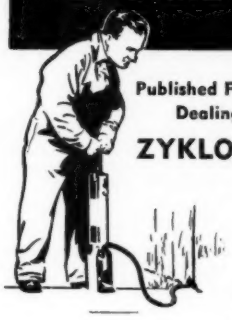
Directors of the State association held their semi-annual meeting to discuss problems of the industry on July 22 at the Palace Hotel in San Francisco. Tentative plans for the 1945 Conference-Convention, which is to be held in that city, were made. Proposed changes and additions to the State Structural Pest Control Act took up the greater part of the program, with many recommendations and suggestions proposed. Chairman to the Legislative Committee will be announced at a later date. Plans for organization of new districts and a drive for additional members are being developed. President Eddy was host to the directors and their ladies at his home in Oakland, where dancing, games and refreshments rounded out an evening enjoyed by all.

Memphis Pest Control Operators

Rumor has it that three of the active firms of Memphis, Tennessee met on Thurs-

(Continued on page 33)

FUMIGATION NEWS



Published For The Information Of The Pest Control Industry
Dealing With Fumigation Involving The Use Of

ZYKLON DISCOIDS AND CYANOGAS

AMERICAN CYANAMID & CHEMICAL CORPORATION
Insecticide Department
32-E Rockefeller Plaza, New York 20, N. Y.
Branch Offices—625 Dwight Bldg., Kansas City 6, Mo.
2203 Ferry St. South, Seattle 4, Wash.—Azusa, Cal.

THOROUGH CLEAN-UP AFTER FUMIGATION IMPORTANT

As a safety precaution, spent discs and cans of DISCOIDS should all be removed from buildings immediately after ventilation. Otherwise, they may become a source of trouble.

In one case, State Police found such cans in the hands of children who were playing with them near a building which had just been fumigated. Investigation disclosed that the cans contained spent discs. Inasmuch as the P.C.O. had placed the discs back in the cans, he had undoubtedly intended to dispose of the cans later, but neglected to do so.

To avoid this sort of thing, the P.C.O. should make it a routine part of his fumigation procedure to gather up all spent discs and ZYKLON DISCOIDS cans immediately after ventilation and burn or bury the discs. If it is inconvenient to do this at the place of fumigation, then the discs should be taken to the nearest spot where they can be disposed of in a thorough manner. As for the cans, considering the necessity for conserving tin, these should be turned over to the local collection agency—after labels have been removed, or the P.C.O. may find many uses for them in his stockroom.

HOW TO MAKE MUNICIPAL DUMPS RAT-FREE

The question is often asked, "Where should a city rat clean-up campaign start?"

And the answer is, "At the city dump, which is usually the foci of infestation."

Once the city dump has been cleaned up, the Pest Control Operators may be called upon to exterminate rats in other harborages. In addition to treating ground burrows and other outside hiding places, rats must be killed in buildings. Rat-proofing of food warehouses is particularly important if the campaign is to be a successful one. Otherwise, reinfestation from the rodents will soon occur. Old buildings which are about to be demolished should be treated with CYANOGAS to prevent migration of the rats to other structures.

Favorite rat haunts under buildings should be treated regularly with CYANOGAS, a safe and effective fumigant.

Health authorities and P.C.O.'s the world over have found CYANOGAS A-DUST the most efficient rat destroyer. It kills rats in burrows, along ditch banks, in city dumps, under pavements and tight floors, in lumber piles, on poultry farms, in grain elevators, stockyards. In fact, wherever rats are they can be gotten rid of with CYANOGAS.

SAFETY FIRST

Testing for the presence of HCN (the active ingredient in ZYKLON DISCOIDS) after ventilation is becoming more and more regular routine procedure with P.C.O.'s. For convenience of operators, the bottle of papers contains a combination label giving instructions and color chart.

--BOOKS--

Broaden Your Knowledge—Increase Your Proficiency—Help You in Your Business

Insect Pests

By WM. CLUNIE HARVEY and HARRY HILL
Price $4.25 plus 15c postage

The extermination of vermin is a skilled proceeding requiring the employment of scientific methods and of persons possessing technical knowledge. This authoritative book will prove of definite and practical value for all who are interested in the control of insect pests and in the prevention of disease.

CONTENTS: General Outlines of Insect Control; The Bed-Bug; The Flea; The Louse; Other Insect Pests; Building Construction and Infestation; Gaseous Fumigants; Other Specifics; The Technique of Fumigation; Insect Control and Educational Measures; Legislative Control; Human Toxicology; Disinfestation of Foodstuffs; Disinfestation of Ships; Forms and Records; Index.

Chemical Formulary—Vol. VI

By EDITOR-IN-CHIEF, H. BENNETT
Price $6.00 plus 15c postage

Contains thousands of new formulae that are not in the previous five volumes—the result of hundreds of chemists and engineers. It gives numerous details about methods of working and manner of use that are of the utmost value in the preparation of every commercial or technical product. Improve your products! Create new ones!

PARTIAL LIST OF CONTENTS: Rubber and Latex; Adhesives; Polishes; Lubricants; Drugs; Farm and Garden Specialties; Resins; Cements and Concrete; Synthetic Resins; Plating; Pyrotechnics; Solders; Welding; Insecticides; Pharmaceuticals; Oils and Fats; Liquors; Dyeing and Coloring; Fluxes; Explosives; Paints; Lacquers; Varnishes; Leather; Skins; Furs; Automobile Specialties; Removing Stains; Bleaches; Ceramics; Deodorants; Disinfectants; Laundry Specialties; Dental Products; Etching; Fireproofing; Animal Remedies; Boiler Compounds; Glass; Textiles; Fibres; Beverages; Flavors; Rustproofing; Metal Treatments; Food Products; Enamels; Cosmetics; Marking Compositions; Inks; Soaps; Cleaners; Waterproofing; Metals; Alloys; Glues; Pastes; Fireworks; Waxes; Mildewproofing; Chemical Specialties.

Emulsion Technology

A SYMPOSIUM
Price $5.00 plus 15c postage

A timely and practical book which discusses the new developments in emulsions and the outstanding role they are playing in industry. Much valuable data, concerning the equipment and techniques used in the manufacture of emulsions, are included.

CONTENTS: Mechanism of Emulsification; Fundamental Principles of Practical Emulsion Manufacture; Use of Highly Dispersed Emulsions in the Treatment of Toxaemic Conditions; Emulsions in the Patent Literature; Industrial Emulsion Formulation; Design of Emulsifying Machines; Effect of the Mode of Preparation on the Dispersion of Soap-Stabilized Emulsions; Problems Connected with the Preparation and Application of Emulsions Used in Agricultural Spraying; Observations on a Typical Food Emulsion; Emulsions and Emulsification in the Wool Textile Industry; Stability of Emulsions in Thin Films; Emulsion Paints; Emulsions in the Leather Industry; Rubber Latex; Physical Properties of Dispersions of Asphaltic Bitumen; Index.

Substitutes

By H. BENNETT
Price $4.00 plus 15c postage

A handbook of substitutes and alternatives for chemicals, fibres, metals and other commercial products including a plan for choosing proper substitutes. This book is the result of the author's wide knowledge of substitutes and alternatives for numerous products in diverse industrial fields.

CONTENTS: Substitute Requirements; Formulation; Proportions; Methods of Manufacture; Costs; Use of the Finished Product; Testing; List of Substitutes and Alternatives.

Practical Emulsions

By H. BENNETT
Price $5.00 plus 15c postage

An authoritative handbook which concentrates upon the more practical side of manufacturing, using and evaluating emulsions for industrial use and commercial distribution.

CONTENTS: Emulsifying Agents; Types of Emulsions and Foams; Methods; Formulation, Equipment; Stability; General Technical Emulsions; Dispersing Agents and Wetting Agents; List of Emulsions; List of Demulsifying and Defoaming Agents; Agricultural Spray Emulsions; Cutting Oils, Soluble Oils, Miscible Oils; Emulsifying Agents; Bituminous Emulsions; Cleaners and Soaps; Cosmetic and Drug Emulsions; Defoaming Agents; Food Emulsions; Gasoline Emulsions; Lacquer Emulsions; Leather Treatment Emulsions; Lubricant Emulsions; Medicinal Emulsions; Paint Emulsions; Paper Processing Emulsions; Polish Emulsions; Resin and Rubber Emulsions; Textile Emulsions; Miscellaneous; Dispersions.

Practical Tree Surgery

By MILLARD F. BLAIR

An authoritative manual indispensable for Spray Operators and Tree Surgeons. It gives valuable information pertaining to the association between trees, fungi, and insects; and discusses the means employable in obviating some of the most serious injuries to them. Contains 89 excellent illustrations and line drawings.

Cloth binding ..... $4.00 plus 15c postage
Special binding ..... 5.00 plus 15c postage

SANITARY PRODUCTS
And Their Manufacture, Testing and Use

A practical handbook dealing with disinfectants, insecticides, liquid and oil soaps, floor waxes, deodorizing blocks, soap dispensers, sprayers, etc. Includes testing, packaging and labeling. Of value to manufacturer, salesman, purchasing agent, superintendent, health officer and any one else associated with the sanitary products industry.

Order from PESTS—Price $5.00 plus 15c postage.

Insect Enemies of Shade Trees

By GLENN W. HERRICK

This book discusses primarily the problem of preservation of shade trees from insect pests also describing accepted methods of fertilizing shade trees. It is intended for pest control operators engaged in the business of treating and caring for shade trees, and for all others interested in preserving shade trees. The book discusses in detail all the important insect enemies of shade trees east of the Rocky Mountains, and most of those on the Pacific coast. The book is illustrated with 350 photographs and drawings. Contains 417 pages. **Price, $5.00 plus 15c postage.**

202 Common Household Pests of North America

BY DR. HUGO HARTNACK

A 320 page book dealing with 202 common household pests of North America and showing about 400 illustrations.

The book contains valuable information. It not only deals with all common and less common household pests, but also with rodents, pigeons, sparrows, spiders, centipedes and mites. All are arranged in a distinct systematic order which makes it easier for one to know the relationship of each pest.

A book that should be in every PCO library.

Price $5.00 plus 15c postage

"How to Know the Insects"

A very valuable book for every pest control operator. This book, with its 140 pages and more than 250 careful drawings, is an excellent reference book for P.C.O.'s as well as for experienced entomologists.

Price for spiral binding..... $1.00 plus 15c postage
Price for cloth binding..... 1.80 plus 15c postage

The Chemistry of Synthetic Substances

By EMIL DREHER

"A brilliant summation of the latest research in the chemistry of synthetic substances. We recommend this book highly for its completeness. It will satisfy those who have waited for a thoroughly competent dissertation in the field."

Price $3.00 plus 15c postage.

The World of Insects

By CARL D. DUNCAN
Professor of Entomology and Botany
and GAYLE PICKWELL
Professor of Zoology
SAN JOSE STATE COLLEGE

In this new book the authors give a general view of a vast and fascinating world.

Comparatively brief and nontechnical, the book reviews the many fields upon which the insect impinges, discussing such topics as insect structures, how insects grow up, insect food and feeding habits, insect food-getting devices, how insects reproduce themselves, how insects get air, how insects move, how insects are protected, insect voices, insect fitness, insect orders, social life among the insects, the value of insects, injurious insects and their control, where to look for insects, rearing insects, and how to collect and preserve insects.

One of the outstanding features of the book is the collection of 194 unusual illustrations, including many striking photographs original with the authors.

393 Pages, 6x9, Illustrated.....$3.50 plus 15c postage

Our Enemy . . . The Termite

By THOMAS E. SNYDER
Senior Entomologist, Bureau of Entomology and Plant Quarantine, U. S. Dept of Agriculture

A book full of valuable information every member that deals with termite control should have.

Price $3.00 plus 15c postage.

Termites and Termite Control

An indexed reference book produced by the University of California Termites Investigation Committee of engineers, scientists, and business men in six years' collaboration.

Contains the latest researches in facts on termites, the latest practical methods for exterminators, builders and architects. Contains 795 pages, including index; profusely illustrated.

Price (the new edition), Cloth Bound.....$5.00
Plus 15c postage.

The Knack of Selling Yourself

The "Knack of Selling Yourself" is just off the press. It is a good book for every P.C.O. to have in his library, for it deals with ideas and methods of selling oneself to the public. Every P.C.O. has this problem and on the successful solution of this problem depends the success of his business. This book definitely aids in the solving of this difficulty, contains 234 pages and is full of new ideas. Order from PESTS. The cost is $2.50 plus 15c postage.

"A Manual for the Study of Insects"

This book of 401 pages and 633 illustrations is now in the twenty-first edition. Much space is given to accounts of the life histories and habits of insects. By means of the illustrations and analytical tables it is possible to determine the identity and classification of the common North American insects.

The Book Sells for $4.00 plus 15c postage.

"Destructive and Useful Insects"

By METCALF AND FLINT

A new edition just recently off the press that not only deals with classification, identification and history of insects, but discusses the habits and control measures as well as suggested formulae. The book contains 981 pages with 584 illustrations. One of the most complete books of its kind on the market.

Price $7.50 plus 15c postage

ORDER FROM PESTS, 512 EAST 14th ST., KANSAS CITY, MO.

Encyclopedia of Substitutes and Synthetics

An invaluable reference book prepared with the cooperation of the foremost chemical and industrial laboratories of the U. S.

The book discusses substitutes of interest to all branches of industry, manufacture and pharmaceutics.

This encyclopedia, the first of its kind in any language, should prove to be of tremendous usefulness to industrial and laboratory chemists who are in search of new and improved material.

This book sells for $10.00—have only 1 copy—Price $7.00 plus 15c postage

Virus Diseases in Man, Animal and Plant

A survey and reports covering the major research work done the last decade.

The book gives a survey of the monetary status of virus investigation with special consideration of the most recent literature, especially foreign. One of the most important books of its kind offered.

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Sanitary Entomology

By WM. DWIGHT PIERCE, Ph. D.

A comprehensive book that deals with Entomology of Disease, Hygiene and Sanitation. Many have desired to have a copy of this book, but we believe it is now out of print and fortunately we have but one copy on hand. An excellent book to have in your library.

Price $5.00 plus 15c postage

Local Organization News

(Continued from Page 31)

day evening, August 3rd, to discuss matters for the good and welfare of the industry. Those attending the meeting were Bill Hill of the Hill Termite Control Systems, Myron Smith of the Jenkins Pest Control Company, and Louis Kotler of the Orkin Exterminating Company, Incorporated.

All three have made reservations to attend the 12th Annual Meeting, which is to be held in Chicago, Ill., next October.

HE'S TELLING US?—Madrid, May 3.—There are about 80,000,000 rats in greater Germany, according to "Voelkischer Beobachter," Adolf Hitler's newspaper, received here today.

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Economically, Permanently, Positively and **Lawfully** from any type of structure.

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Exterminating business on or near West Coast wanted by highly experienced operator. Can pay Cash. Box 60, c/o Pests.

WRITE FOR THESE BOOKLETS

The latest helpful information service literature will be sent to you without cost or obligation. If, in addition, there are any particular pieces of literature offered by advertisers in this issue you are interested in receiving, either write them direct, or if you prefer, please send us such requests.

Please note, however, that you must request each booklet on a separate letterhead though they may all be mailed in one envelope addressed to Pests, 126 Lexington Avenue, New York City, N. Y.

SPECIAL ROACH POWDER

Circular describes a roach powder (containing Lethane A 70) which, it is stated, is fast acting, positive in kill and will not deteriorate for at least eight weeks after application. As a result, the supplier points out, the PCO does not have to service his customers as often, thereby conserving manpower. Moreover, it is stated, the powder is non-toxic to warm-blooded animals and may, therefore, be used in dairies, packing and food handling plants, homes, etc., in fact, in all places where sodium fluoride mixtures may not be used. . . . Described also is a sodium fluoride-Pyrane formulation for the PCO who wishes to make his own roach powder.

WRITE PESTS—Bosley.

SYNTHETIC ROACH POWDERS

Research material apropos thiocyanates in powdered form for roach control in place of pyrethrum — describes the development and properties of roach, ant and bedbug powder based on Lethane A-70.

WRITE PESTS—SYNTHETIC.

MILITARY FUMIGATION MANUAL

This special 48 page manual has been prepared for the benefit of officers and civilians in the Armed Forces who are responsible for vermin control, and for PCOs who may contract with the Armed Forces for fumigating work. Among other subjects, the manual discusses: dosage, preparation of building for fumigation, fumigation operation, common pests, cockroach control; precautions, first aid methods, etc.

WRITE PESTS—AC.

TERMITE CONTROL

Folder discusses concentrates available for two distinct methods of termite control: (1) treatment of timbers in place with an oil solution, and (2) treatment of all soil around an infested building or area with either an oil or water soluble chemical. Issuing company states it specializes in all problems concerning wood-destroying organisms and also wood preservation and invites your inquiries thereto.

WRITE PESTS—WOOD.

FUMIGATION SAFETY SUGGESTIONS

Of timely interest, in view of the at-hand fumigation season, is this bulletin which advocates as a safety measure the use of methyl orange-mercuric chloride test papers for the presence of HCN. It also discusses can openers for Zyklon Discoids, the need for adequate ventilation after fumigations, and gives a cautionary note on pilot lights in premises to be fumigated.

WRITE PESTS—AMERICAN.

STERILIZING GAS MASKS

News bulletin describes a chemical that is claimed by the manufacturer to be effective in sterilization of gas masks. Bulletin also discusses antidotes and first aid, particularly an inhalant which functions best as an antidote to HCN poisoning, and where obtainable.

WRITE PESTS—A-C-73

RAT GLUE AND BOARDS CIRCULAR discusses use of rat glue boards as a means for effective rat control, etc.

WRITE PESTS—ELKAY.

FUMIGATION AND PLASTICS

News release discusses use-co-ordination of such diverse chemical products as plastics and fumigants in connection with infested bagged grain, seed, packaged or boxed foodstuffs. Methyl bromide-plastic-tarpaulin method of disinfestation described.

WRITE PESTS—DOW

The Texas Gulf Sulphur Co. has recently published a revised copy of The Use of SULPHUR in the CONTROL of TRUCK CROP and CANE FRUIT INSECTS and DISEASES. Any desiring a copy of this booklet which is for free distribution, can obtain it by writing to The Texas GULF SULPHUR Co., Second National Bank Bldg., Houston 2, Texas.

PYRETHRUM - DERRIS - RED SQUILL PRODUCTS

Leaflet describes foregoing insecticides with special bait chart for use in connection with powdered red squill.

WRITE PESTS—PRENTISS.

SOLVAY PRODUCTS

48-page booklet in colors and illustrated, covering their entire line of Alkalies and Special Products, with a special section dealing with Para-Dichlorobenzene and Ortho-Dichlorobenzene.

FREE COPY MAY BE HAD BY PEST CONTROL OPERATORS. WRITE SOLVAY, c/o PESTS.

DEODORANT

Catalog includes price data, etc., on deodorant which it is felt can neutralize and deodorize such toxic agents as Thanite, Lethane 384 Special, Velsicol, etc. Also contains data on perfume oils for sprays made with pyrethrum and kerosene.

WRITE PESTS—MAGNUS.

ELECTRIC FANS

Bulletin discusses value of electric fans in connection with fumigation work, also some pertinent thoughts on the Schafer Prone Pressure Method of Resuscitation, etc.

WRITE PESTS—AC-69.

MOLE KILLER PELLETS

Circular describes mole killer pellets which manufacturer states requires no traps, no gas, no exposed poison. Diagram of runways and explains how mole lives. Testimonial letters.

WRITE PESTS—CARAJON.

NEW CHEMICAL PROCESS OFFERED FOR RAT-PROOFING

Circular discusses a liquid oil spray that is made from the serum of a skunk, which, it declares, is a revolutionary method for repelling rats and mice from buildings, warehouses, etc. Its odor, in raw liquid state

resembles that of a ferret, according to the circular. The spray, it further states, has, to a rat or mouse, the same odor as a ferret. Applied with any kind of a hand sprayer, the spray is colorless, guaranteed to be non-poisonous to man or animals, has no offensive odor whatsoever and is guaranteed not to affect foodstuffs. One ounce, when sprayed according to directions, will treat an average sized room and as soon as it is sprayed on wood, plaster or other porous materials, it sinks in and lasts for a full six months. If used on brick, stone, tin or other non-porous materials, states the circular, the coating will last for at least thirty to forty days before wearing off.

WRITE PESTS—Belmont.

NEW PERFUMING PRINCIPLE FOR INSECT SPRAY TOXIC AGENTS

Perfume Oil Fruit Berry MM&R is called the first new and different neutralizer-perfume in a decade, by Magnus, Mabee & Reynard, Inc., New York essential oil house.

Perfume Oil Fruit Berry MM&R not only neutralizes the odor of toxic agents, but imparts a truly refreshing fragrance of uncommonly light character. It has a definite fruity scent. A remarkable feature is that it has so light a fragrance, yet has the hiding power to give lasting coverage of heavy odors. This feature will be of particular interest for sprays used in food plants, bakeries, etc.

Fragrance of sprays, up to now one of the unmentionables of insect toxicants, now becomes an asset instead of a liabillity. Samples may be had by writing PESTS—Mabee.

ALL-PLASTIC GOGGLE

Circular describes a new lightweight, all-plastic goggle which provides comfortable, durable protection for the eyes. The individual eye cups are moulded to fit the facial contours, giving a close yet comfortable seal around eye orbits, according to the circular. Particularly useful for spraying in termite control, as well as heavier bedbug spraying operations, to prevent direct sprays from getting into the eyes themselves—available in different models.

WRITE PESTS—Mine.

ALABAMA OPERATES STATE-WIDE RAT CONTROL PROGRAM TO STOP SPREAD OF TYPHUS FEVER

An article written by Dr. Andrew J. Perolio, State Director of Typhus Control of the State of Alabama which describes the State's program for stopping the spread of typhus fever.

WRITE PESTS—AC.

LETHANE A-70

Folder discusses roach, ant and bedbug powders based on this new insecticide concentrate. Described are: safety factors, cost per application, killing power, performance data. residual activity, tenacity, etc.

WRITE PESTS—A-70.

INSECT TRAPS

Bulletins describe traps for ants and roaches, with suggestions for their use.

WRITE PESTS—SOILICIDE.

RESPONSE OF RATS MAINTAINED ON DIETS FUMIGATED WITH METHYL BROMIDE

Research material reprinted from Food Research.

WRITE PESTS—DOW-RESEARCH.

FUMIGATION SAFETY RULES

Bulletin discusses fumigation safety rules with respect to mattresses, pillows, bedding, clothing and bedroom rugs, etc.

WRITE PESTS—AC No. 79.

FUMIGATION SAFETY RULE

A review of fumigation accidents of record for 1943 shows that oversight or disregard of rule to lock all doors and accessible windows, failure to place warning signs thereon and failure to post guard during fumigation account for approximately 20% of the accidents. Bulletin discusses ways and means to eliminate accidents of this nature.

WRITE PESTS—AC No. 80.

PRESERVATION OF MILLWORK AND OTHER DRY WOOD PRODUCTS

Bulletin discusses composition of Permatox B Concentrate and its application in the preservation of millwork and other dry wood products.

WRITE PESTS—Permatox 43-B.

SODIUM SILICO FLUORIDE

Bulletin describes sodium silico fluoride product with proper density. Effective manner of testing for presence of HCN after ventilation also discussed.

WRITE PESTS—AC 70.

Fumigation manual. 76-page manual describes safe handling and working with "Cyanegg" and on fumigation procedure and insect control. Illustrated.

WRITE PESTS—DuPONT .

GAS MASKS—RAT CONTROL PROGRAMS

Bulletin offers some pertinent suggestions regarding gas masks and how to keep them in perfect condition. It also discusses rat control programs and what the PCO can do to further them.

WRITE PESTS—AC82.

THE ACTIVATING EFFORT OF PYRETHRUM UPON THE GERMAN COCKROACH

Research material prepared by John M. Hutzel, of the Ohio State University, Columbus, Ohio in cooperation with the Kenya Pyrethrum Extension Service, Inc., N. Y. Supervised by Professor F. L. Campbell.

WRITE PESTS—PYRETHRUM.

NEW ANT TRAP

Manufacturer claims many new features such as no turning or twisting necessary; four openings; larger trap; contents ⅓ greater than any other competitive brand.

WRITE FOR YOUR FREE SAMPLE OF ANT TRAP TO NOTT, c/o PESTS.

CALCIUM CYANIDE FOR RAT CONTROL

36-page booklet contains excerpts from official publications and reports of health officers throughout the world regarding use of calcilum cyanide in the control of rats. The widely differing conditions surrounding infestations, and the specific types of control for each, which are described, will serve as suggestions to health officers and others in solving similar problems.

WRITE PESTS.

BOX CAR FUMIGATION

Folder describes box car fumigation with methyl bromide, giving details as to: car seal, applicator arrangement, methyl bromide application, dosage, exposure period, temperature, aeration, precautions.

WRITE PESTS—DOW

DOG-CHECK

Circular describes remedy which manufacturer claims is effective for breaking dogs and cats of their undesirable habits, that rain will not wash it off, odor will last for three weeks and can be sprayed directly on new growth. Free sample if you write on your letterhead.

WRITE PESTS—NOTT CO.

FUMIGATION SAFETY RULE

Bulletin discusses importance of personal inspection of entire premises immediately before releasing gas, and offers some constructive suggestions with respect thereto.

WRITE PESTS—A C 81.

PRESERVATION OF LUMBER, POLES, POSTS, PLYWOOD WITH PENTACHLORPHENOL

This bulletin gives a brief summary of the properties, use to date, and recommendations for the preservative treatment of lumber, poles, posts, and other forest products with Permatox A. This product, it is stated, has shown outstanding promise as an effective and permanent oil preservative for many wood products. Set forth briefly also, are recommendations for the effective preservative treatment of lumber, poles, posts, and other forest products with Permatox A, based upon experience to date.

WRITE PESTS—BULLETIN 43-A.

VICTOR GLADIATOR METAL RAT TRAP

The Victor Gladiator Rat Trap is made of 22 Gauge Steel, Gun Metal finish. Equipped with strong double-coil spring made of 15 gauge oil tempered spring wire. Copper coated metal bait pedal and heavy wire work throughout. Note holes in base for nailing to floor, rafters, or wall.

The Victor Gladiator has been designed especially for professional use by public health officers, sanitary officers of the armed forces, and pest control operators. It is of rugged construction and is particularly adapted to outdoor use; especially recommended for the tropics and on shipboard, not readily affected by continuous contact with moisture.

Actual size 7⅛x3⅝x½". Weight, packed 1 dozen, 4½ lbs. Weight, packed 6 dozen, 29¼ lbs.

WRITE PESTS—VICTOR.

PIGEON-PROOFING

Folder describes pigeon-proofing invention which manufacturer claims will completely and decisively eliminate the pigeon nuisance. In use by real estate companies, churches, government buildings, etc.

WRITE PESTS—STANLEY.

FIRST AID AND TREATMENT FOR METHYL BROMIDE EXPOSURE

This valuable booklet, prepared by Dr. H. H. Gay, Medical Director, The Dow Chemical Company, Midland, Mich., outlines first aid and treatment for Methyl Bromide exposures. Contents are based upon what is believed to be sound medical practice. Digest follows: properties of Methyl Bromide, symptoms of Methyl Bromide exposure, first aid, suggested treatment by a physician, skin contacts with Methyl Bromide. Copy may be had by writing Dow direct, or

WRITE PESTS—Gay.

SAFETY IN FUMIGATION WORK

Fumigation Safety Rule No. 1; namely, "Vacate entire building even though only part is fumigated, as well as adjoining buildings into which gas may penetrate" is discussed in this bulletin.

WRITE PESTS—AC No. 78.

INSECT COLLECTIONS

Booklet describes pocket display case which may slip easily into a coat pocket making it of value for salesmen or others who travel about. Life history collections of structural type pests are also available for the PCO.

WRITE PESTS—Ward's.

THE NPCA'S 12th ANNUAL MEETING AND THE SUPPLY HOUSE

On October 23, 24, 25, at the Hotel Sherman in Chicago (Ill.), PCO's and their guests, from the U. S. and Canada, will hold their Annual Meeting under the auspices of the NPCA—12th of its consecutive annual get-togethers and perhaps its most important to date.

Furtherance of the war effort, pest control problems in the post-war world, materials and methods, latest developments in the newer insecticides as well as the old stand-bys, "good practices" and "Standards of Performance"—all these and subjects of equal importance will be on the agenda. In short, a program of constructive interest.

Per its custom, PESTS and their CONTROL, the Industry's journal, will devote the editorial contents of its October issue to advance publication of the program of the Annual Meeting, together with related highlights. Because of this and other timely information of tangible war-winning value the issue will carry, it will be of more than passing editorial interest.

To implement the need for widest dissemination of the program details in advance of the meeting itself, the October issue will be mailed to every PCO on PESTS' list, whether subscriber or not, and that means practically every known PCO in the U. S. and Canada, plus many insecticide manufacturers, supply houses, entomologists and others, all of whom will receive a copy, with extra distribution, for extra good measure, at the Chicago meeting itself.

This raises the question: What does this all add up to for the supply-house advertiser? The answer is simply that it will make for an issue with a grand total of approximately double the circulation of any other single issue of the year, and one in which space can still be bought—believe it or not—at our regular, low advertising rates—and that, in these days of rapidly mounting prices, is something.

That the insecticide manufacturer or supply house will find it a measure of good business to engage advertising space in this all-important October issue is, we think, undeniable. Several copy thoughts suggest themselves: (1) you can announce your regrets at the dearth of supplies and your inability to take care of the PCO's requirements in full or in part; (2) suggest possible substitutes, replacements, etc.; (3) announce new insecticides whether now available or not; (4) insure that your sales story reaches your PCO prospects at a time when the question of supplies and supply sources is uppermost in their minds; and (5) above all, come what may, keep your name before the Industry.

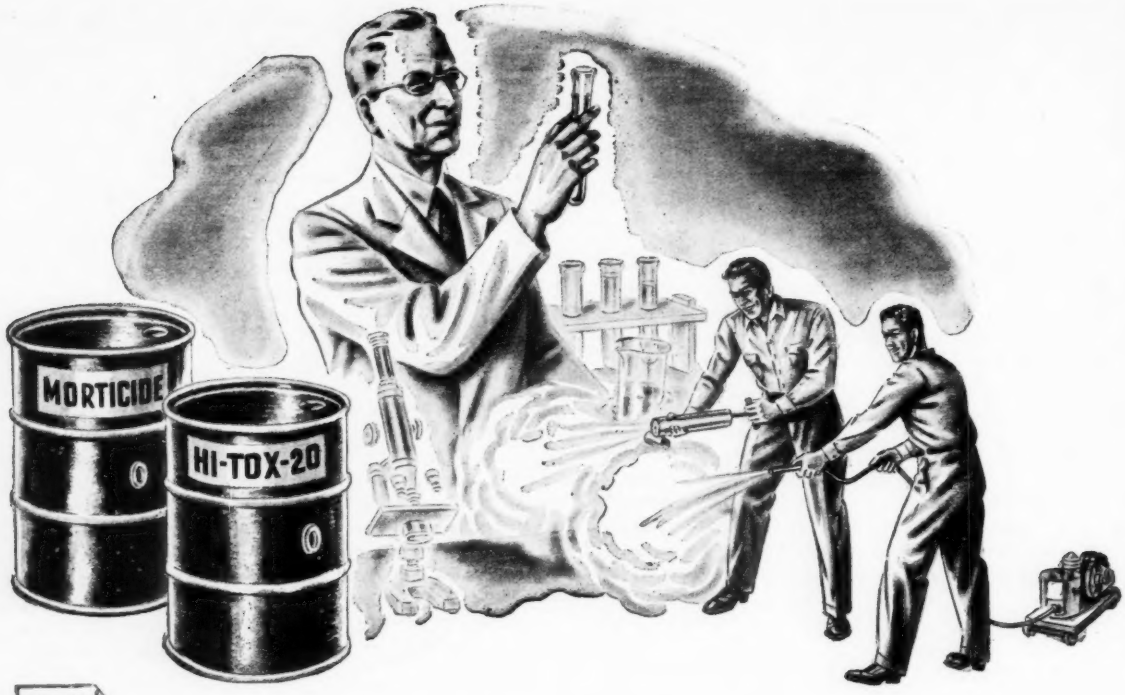
This is the kind of a story that should be told now. It can be told, most effectively and most opportunely, through the October issue of PESTS and their CONTROL, the publication the PCO reads regularly and consults continually in the practice of his profession and the conduct of his business.

Whether the Industry supplier plans personal representation at the Chicago meeting, as we hope is the case, or whether physical representation is impractical this year, making some other form of personal, on-the-spot contact more essential than ever, in either event, the industry supplier can do no better, we think, than to forward without delay (advertising forms close tight on September 25) copy instructions for our October N.P.C.A. Annual Meeting issue—an issue which, for all practical purposes, will have overall coverage of America's PCOs at the right time and at modest cost.

For further information (promptly and with pleasure!) write:

PESTS and Their Control 512 E. 14th St., Kansas City, Mo. (6) or 126 Lexington Ave., N. Y. City (16)

N.B. Attention is also directed to the advertising value inherent in our November post-Annual Meeting issue. Containing the complete story of events occurring there, it should have high reader interest not only for those PCOs who attended but also for those, who, for one reason or another, did not.



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Hi-Tox 20, Morticide and Super-Morticide are in no sense merely substitutes for Pyrethrum and Rotenone They are the products of a chemist's skill and knowledge, designed as high-powered insecticide concentrates, and will fill their niche in the Insecticide Industry of the Future.

Effectiveness, Economy and Endurance are three basic traits of these products which insure their acceptance by Insecticide Manufacturers and Pest Control Operators alike.

HI-TOX 20 for fly and cattle sprays.

MORTICIDE and SUPER-MORTICIDE for bed-bug sprays.

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